INSTRUCTION BOOK

for

MODEL 804-LX
U.H.F. SIGNAL GENERATOR

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Manufactured
By
FEDERAL MANUFACTURING & ENGINEERING CORPORATION
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HIGH VOLTAGE WARNING

THIS EQUIPMENT employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

SAFETY AND WARNING NOTICES

While every practicable safety precaution has been incorporated in this equipment the following rules must be strictly observed.

1. KEEP AWAY FROM LIVE CIRCUITS. Under no circumstances should any person other than authorized maintenance personnel be permitted to reach within or in any manner gain access to the enclosure with interlocked gates or doors closed; or with power supply line switches to the equipment closed; or to approach or handle any portion of the equipment which is supplied with power; or to connect any apparatus external to the enclosure to circuits within the equipment; or to apply voltages to the equipment for testing purposes while any non-interlocked portion of the shielding or enclosure is removed or open. Wherever feasible in testing circuits, maintenance personnel should check for continuity and resistance rather than directly checking voltage at various points.

2. DON'T SERVICE ALONE. Under no circumstance should any person reach within or enter the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

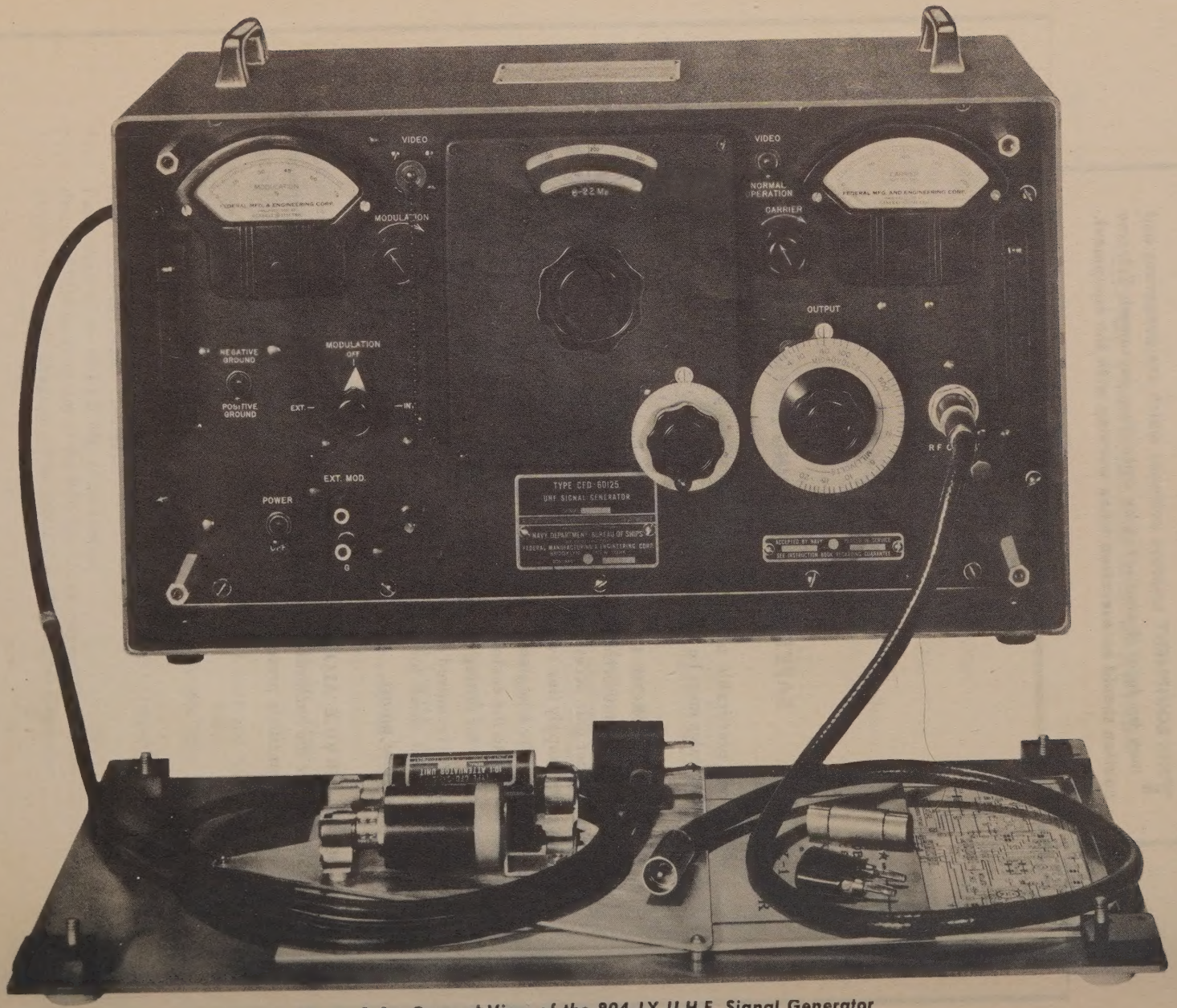


Figure 1-1—General View of the 804-LX U.H.F. Signal Generator

CAUTION

This is a precision instrument. It should be carefully handled and these instructions should be read and studied in their entirety before the equipment is operated, in order that the very best performance and usefulness may be obtained and damage to the instrument avoided.

SECTION I
GENERAL DESCRIPTION

1. GENERAL.

a. The Model 804-LX U.H.F. Signal Generator is a device for the production of radio frequency voltages over a continuous range of frequencies. It is so constructed and shielded that an approximately accurate known voltage is obtainable at its output terminals in varying strength as selected from a dial calibrated in output voltage over a range of from one microvolt to 20,000 microvolts.

b. It operates from the normal 105-125 volts 40-60 cycles A.C. lines, or by a slight change in wiring on the power transformer it may be converted to operate at 210-250 volts A.C. 40 to 60 cycles. This wiring change is clearly described in schematic diagram Figure 7-13.

2. QUICK REFERENCE DATA.

a. The following information is given for quick reference purposes and contains pertinent data applicable to the 804-LX Signal Generator:

(1) Frequency Range—7.5 megacycles to 330 megacycles.

(2) Output Voltage—1 to 20,000 microvolts up to 100 mc.; over 100 mc.—1 to 10,000 microvolts.

(3) Internal Modulation Frequency—1000 cycles per second.

(4) External Modulation—200 cycles to 10 kc. $\pm$ 1 db.; 100 cycles to 20 kc. $\pm$ 3 db.

(5) Modulation Range — Internal 0 to 60%, External 0 to 75%.

(6) Power Supply—Self-contained, Input volts—105-125 or 210-250 volts A.C., 40 to 60 cycles, single phase.

(7) Power Consumption—25 watts at 115 volts A.C.

(8) No. of Packages in Complete Shipment—One Case.

(9) Total Cubic Contents—See Table below.

(10) Total Weight—See Table below.

(11) Vacuum Tube Complement—See Table Par. 4.

EQUIPMENT SUPPLIED

Quantity	*Numerical Series of Reference Symbols*	*Name of Unit*	*Navy Type Designation*	*Overall Dimensions (inches)*						*Volume (cubic feet)*		*Weight*	
				Crated			*Uncrated*						
				Height	*Width*	*Depth*	*Height*	*Width*	*Depth*	*Crated*	*Uncrated*	*Crated*	*Uncrated*
1	1-199	Model 804-LX U.H.F. Signal Generator	CFD-60125	19 3/8	28 1/2	19 1/8	12 19/32	19 9/16	10 13/16	5 1/2	1 3/4	118 lb.	41 lb.
1	W-1	Coaxial Output Cable	—										8 oz.
1	W-2	A.C. Line Cord	—										1 lb.
1	J-201	10:1 Attenuator Unit	CFD-631210										5 oz.
1	J-301	Terminal Unit	CFD-49182										5 oz.
1	J-3	Coaxial Connector Plug	CFD-49181										1 oz.
1	P-3	Double Plug	—										1 oz.
2	I-1	Pilot Light	—										1/2 oz.

3. DETAILED DESCRIPTION.

a. The rated frequency range is 7.5 megacycles to 330 megacycles. This wide range is covered by five bands, any one of which can be selected by means of a band-change switch on the front of the panel. Within each band the frequency is controlled by a worm-driven tuning capacitor. The driving shaft carries a 100-division dial, fifteen turns of which are required to cover each frequency range. Geared to this tuning dial is a large indicator dial which carries five direct-reading frequency scales corresponding to the five frequency bands. In addition a scale carrying 15 uniform divisions, one for each turn of the driving shaft, is provided. The band-change switch is located in the center of the main frequency dial. A mask covers all frequency scales that are not in use.

b. The frequency can be set within an accuracy of ± 2 per cent from the direct-reading scale. The dial can be reset to a given value to a precision of about one part in 3,000. In addition to the five frequency bands, a sixth position of the band switch is provided. A plug-in type of inductor form, without winding, is furnished (see Sect. IV, Par. 7).

c. The output is continuously variable from 1 to 20,000 microvolts at frequencies below 100 megacycles, and from 1 to approximately 10,000 microvolts at frequencies above 100 megacycles. The accuracy of calibration of the output attenuator dial is ± 10 per cent; ± 0.5 microvolt at the lower frequencies (up to 25 megacycles). At the higher frequencies the absolute level of the output voltage is not accurately known, although attenuation *ratios* are quite accurately maintained. Hence, the instrument is not to be considered as a *standard* signal generator, or source of accurately known voltages, at all frequencies.

d. The Signal Generator has an internal stabilized power supply and to place it in operation turn the switch S-1 (see Fig. 7-12) to the POWER position.

e. The Signal Generator also has an internal modulation source. A 3-way switch (E-5, Fig. 7-12) is provided for selecting internal or external modulation. The modulation frequency is 1000 cycles ± 5 per cent. The percentage of modulation is continuously variable up to 60 per cent and may be read directly on the Modulation Meter (M-1) on the front of the panel. Switch E-5 also makes it possible to completely remove all modulation from the carrier, or to switch over to any external source for frequencies between 100 and 20,000 cycles, and in extreme cases to between 30 and 40,000 cycles with a fair wave form. In the external modulation position the Modulator Tube (V-3) of the Signal Generator is used as an amplifier tube.

f. A switching arrangement on the front of the panel together with a special AN Connector (Type 49194) provides for the introduction of an external source of pulse modulation.

4. TUBE COMPLEMENT.

a. The following vacuum tubes are required, functioning as noted, with location:

VACUUM TUBE COMPLEMENT

No. Req.	*Tube Type No.*	*Function and Symbol*	*Location*
1	6X5G or 6X5-GT/G	Rectifier Tube (V-1)	Vertical in power supply compartment
1	VR-150-30	Regulator Tube (V-2)	Horizontal in power supply compartment
1	6G6G	Modulator Tube (V-3)	Right side of main tuning condenser (viewed from rear)
1	955	Carrier Oscillator Tube (V-4)	Isolanite socket on top of tuning condenser

5. FUNGUS PROOFING.

a. The interior surface of the panel and chassis assembly wherever practical, is sprayed with fungus-proof lacquer. This also includes such components as the R-F chokes; resistors; fixed condensers; cables; outside surface of the Attenuator, metal surfaces; inside and outside the variable condenser wherever practical; complete power supply and modulator assemblies; etc. All the bakelite parts are either varnished or waxed with fungicide. The power transformers and A-F chokes receive two or more coats of fungus-proof lacquer or high-temperature fungus-proof wax.

6. OPERATING ACCESSORIES.

a. Operating accessories consist of the following:

(1) Coaxial Output Cable (W-1)
(2) A.C. Line Cord (W-2)
(3) 10:1 Attenuator Unit (J-201)
(4) Terminal Unit (J-301)
(5) Coaxial Connector Plug (J-3)
(6) Double Plug (P-3)
(7) Spare Pilot Light (I-1)

7. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

a. Generators for pulse modulation, and external modulation at frequencies other than 1000 cycles. Input Cable to Video Jack ,J-2) for pulse modulation (see Sect. III, Par. 7).

SECTION II
INSTALLATION AND ADJUSTMENT

1. UNPACKING.

a. The Model 804-LX Signal Generator is packed in a special type of cushioned corrugated carton, which in turn is packed in a wooden case. Care should be exercised in unpacking. To remove the instrument from the carton after it is opened, lay the carton on its bottom, with the instrument cover facing forward and grasp the two handles on the top of the cabinet and withdraw the instrument from the carton. Figure 2-1 gives the dimensions of the Signal Generator when unpacked.

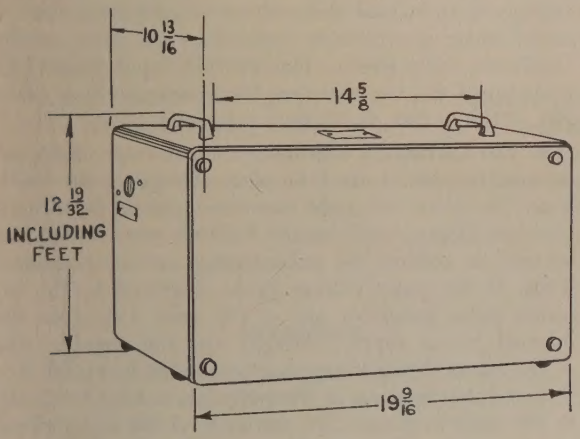


Figure 2-1—Dimensions of the Unpacked 804-LX Signal Generator with Cabinet Cover Attached

b. The accessories will be found stowed inside of the removable front cover as follows—the Coaxial Output Cable (W-1) and A.C. Line Cord (W-2) will be found wound around the long hexagon studs which mount the front cover; the Double Plug (P-3) will be found inserted in the EXT. MOD. binding posts. (See Fig. 7-12). Spare Pilot Lights (I-1) will be found enclosed in a small envelope attached to the panel. The Coaxial Connector Plug (J-3) is inserted in the Coaxial Output Jack (J-1) and must be removed when using regular cables. The 10:1 Attenuator Unit (J-201) and the Terminal Unit (J-301) are held in clips on the inside of the front cover, and may thus be easily removed. Space for the Instruction Book is provided behind these units.

2. INSTALLATION.

a. To place the Model 804-LX Signal Generator in operation, remove the front cover, by unscrewing the captive bolts in each corner, then connect the instrument to the proper power source (105-125 volt, A.C. 40-60 cycles), using the A.C. Line Cord, (W-2). It will also be found good practice to keep the instruments under measurement at least 12 to 18 inches or more away from the Signal Generator to prevent any stray pickup that might be present. The Signal Generator, and all other instruments must be thoroughly grounded. (See Sec. IV WARNING; also Sec. IV, Par. 1, *f, g, h.*

3. ADJUSTMENT.

a. No internal adjustment is necessary. For preliminary adjustments see Sec. III, Par. 1.

SECTION III
OPERATION

1. PRELIMINARY ADJUSTMENTS.

a. To be thoroughly familiar with operation it is essential that both Section III—OPERATIONS and Section IV—THEORY OF OPERATION be read. All references to Symbol Designations thus (S-1) etc., apply to Fig. 7-12 unless otherwise noted.

b. Before throwing the switch S-1 to POWER the MODULATION and CARRIER potentiometer knobs (E-3 and E-4) should be turned to the counterclockwise position. After throwing the switch S-1 to POWER the instrument should be allowed to warm up for about 5 to 10 minutes.

c. The NEGATIVE GROUND — POSITIVE GROUND switch (S-5) should be thrown to the proper position when pulse modulating the Signal Generator (see Par. 7). This switch grounds either the positive or negative side of the internal power supply. In applications where pulse modulation is not used, the switch can be left in either position, as the Signal Generator will generate signals with either polarity grounded.

2. CARRIER FREQUENCY.

a. To set carrier frequency turn the Main Frequency Control Knob (E-1) to desired position and then turn the Fine Frequency Control Knob (E-2) until the desired value on the Main Frequency Dial (N-3) coincides with the hair-line indicator.

3. SETTING OF CARRIER AMPLITUDE.

a. To set the carrier amplitude at the input to the Attenuator, adjust the CARRIER potentiometer control knob (E-4) to give 100 microamperes grid current, as indicated by a reading of 100 on the Carrier Meter (M-2).

b. On the two highest frequency bands it is not always possible to obtain 100 microamperes grid current. Any lower setting is satisfactory. However, the output voltage of the Signal Generator is reduced in direct proportion. The output voltage is then equal to

$$\text{Attenuator reading} \times \frac{\text{Carrier Meter reading.}}{100}$$

4. CW (UNMODULATED SIGNAL).

a. If an unmodulated carrier is desired, the MODULATION switch control knob (E-5), should be set to OFF and the VIDEO—NORMAL OPERATION switch (S-4) at NORMAL OPERATION (See Sect. IV, Par. 5*d*).

5. MCW (INTERNAL MODULATION).

a. To obtain internal 1000-cycle modulation throw the MODULATION switch control knob (E-5) to INT. Adjust the MODULATION potentiometer knob (E-3) until the desired percentage of modulation is obtained as indicated by the Percent Modulation Meter (M-1). There is a slight interaction between the MODULATION and CARRIER controls, and successive readjustments of the two controls may be necessary to obtain the proper carrier level at the desired modulation level (see Sect. IV, Par. 5*d*).

6. MCW (EXTERNAL MODULATION).

a. Set the MODULATION switch control knob (E-5) to the EXT. position. Modulation can be obtained by connecting an external audio oscillator to the EXT. MOD. terminals (H-1) (see Sect. IV, Par. 5*a*). For best results the MODULATION control knob should be set to the maximum position (full clockwise) and the percentage modulation set by adjusting the voltage applied to the EXT. MOD. terminals, by means of the volume control on the audio oscillator. (*Twelve volts is the maximum that should be applied to the* EXT. MOD. *terminals.*) The input impedance at the EXT. MOD. terminals is about 0.25 megohm. Approximately seven volts must be applied to obtain 50 per cent modulation. Double Plug (P-3) is supplied for this purpose (see Sect. 1, Par. 6), or wires can be connected direct to the terminals.

7. PULSE MODULATION.

a. The Signal Generator may also be modulated with an external pulse generator (see Sect. IV, Par. 5*b*). With the VIDEO—NORMAL OPERATION switch (S-4) in the VIDEO position, the plate lead of the Carrier Oscillator is brought out to the VIDEO Input Jack (J-2) through a shielded low-pass filter. The output of an external pulse generator connected to the VIDEO Input Jack is effectively placed in series with the internal plate voltage supply when the positive side of the power supply is grounded. When the negative side of the power supply is grounded the internal power supply is entirely disconnected and only the signal from the external pulse generator is applied to the plate of the Oscillator Tube (V-4). The VIDEO Input Jack (J-2) is designed for use with an AN-Connector Plug Navy No. 49190 or No. 49195 (not supplied).

b. The CARRIER amplitude control knob (E-4) can be used to control the D.C. plate voltage on the Oscillator Tube (V-4) when the switch S-4 is in the NORMAL position. When S-4 is in the VIDEO position E-4 can be used to control the pulse voltage on the Oscillator Tube. If the pulse voltage peaks delivered by the external pulse generator are + 150 volts (equal to the internal power supply voltage) and the negative side of the internal power supply is grounded by switch S-5, then for the duration of the pulse, the carrier level will be the same as the normal carrier level for any position of the carrier control. This may also be done with switch S-5 grounding the positive side of the internal power supply (provided the pulse from the external pulse generator is of the proper polarity and voltage to give a resultant maximum pulse voltage of + 150 volts on the Oscillator Tube). When the Signal Generator is pulse modulated, the reading on the Carrier Meter (M-2) is not a true indication of the carrier level since it does not indicate magnitude of the voltage peaks. *When using an external signal, positive voltages impressed on the video circuit should never exceed 150 peak volts, as higher voltages might damage the Oscillator Tube* (V-4).

8. SETTING OF ATTENUATOR.

a. After establishing the level of the modulated or unmodulated carrier at the desired frequency, the output voltage can be set to any value between 1 microvolt and 20,000 microvolts up to a frequency of 100 megacycles; and any value between 1 microvolt and 10,000 microvolts over 100 megacycles to 330 megacycles.

b. The voltage indicated by the Attenuator Dial is correct for the open circuit condition at the Output Jack.

c. With the 10:1 Attenuator Unit (J-201) in place the output voltage is one-tenth that indicated by the Attenuator Dial, except at the lower frequencies where the multiplying factor shown in Figure 4-6 should be used.

SECTION IV
THEORY OF OPERATION

1. GENERAL.

a. In order that the operator of the Model 804-LX Signal Generator may have a better understanding of the instrument, an explanation of the mechanical and electrical characteristics is given, including simplified circuit diagrams of major sections. The graphs given in this section will enable the operator to apply corrections, if necessary, to the frequency in use at the moment.

b. For specific details of the proper technique involved in the testing, aligning, and servicing of radio receiving equipments by the use of the Model 804-LX Signal Generator references should be made to the instruction books for the receivers. More information can be obtained from the Standards on Radio Receivers of the Institute of Radio Engineers.

WARNING

In Par. 6c a lead from the Signal Generator to ground is suggested to prevent shock. All associated equipment should also be grounded. This connection will not ground high radio frequencies because of the excessive inductance of even a short lead.

c. In connecting the Signal Generator output to the receiver input, the Coaxial Output Cable (W-1) should be employed. The Signal Generator output impedance and Coaxial Output Cable (W-1) impedance are each 75 ohms so that a correct match is obtained. To test receivers having input impedances other than 75 ohms see the receiver instruction book.

d. When the Signal Generator is to be connected to various stages of a receiver, the Terminal Unit (J-301) should be employed. The leads used should be as short as possible. The use of heavy leads, such as copper braid or strip, is advisable at high frequencies. The ground connection should be as close as possible to the point to which the voltage is applied.

e. When the signal is to be impressed on a tube grid it is usually advisable to disconnect all shunt inductances and capacities, unless they constitute a resonant circuit tuned to the impressed signal frequency. The Attenuator of the Signal Generator has no D.C. continuity, and so it may be necessary to shunt a resistor from grid to ground or bias supply. Resistances of 2000 to 10,000 ohms are suitable for the purpose. Accurate measurements can only be made by terminating the coaxial line with a 75-ohm non-inductive resistance. It should not be wire wound, and its leads should be kept as short as possible. When the Coaxial Output Cable (W-1) is connected to the antenna coil of a receiver the shunt impedance of this coil must be taken into account when terminating the cable with the 75-ohm impedance. A 75-ohm load on the Signal Generator reduces its output to one-half the calibrated value, except at the lower frequencies. (See Par. 4*l*).

f. R-F voltages and standing waves are commonly present in the outer sheath of a concentric line when not terminated properly (see Par. 4). This condition is even worse when open lines are used. The proper grounding point or points is determined by a study of the effect of the Attenuator around its maximum attenuation position. When a satisfactory ground system has been found, it should be rechecked if the frequency is changed. It is usually advisable to ground the outer conductor of the Coaxial Output Cable (W-1) at the receiver input, preferably with a concentric plug and jack.

g. It is often helpful to locate both the Signal Generator and receiver on a non-magnetic metal plate, especially if the Coaxial Output Cable is pressed down against the plate. For better shielding an additional braid is sometimes slipped over the cable and grounded to the plate.

h. Even with correct grounding, some trouble may be experienced with direct leakage between the Signal Generator and the receiver. Proper orientation and spacing between the Signal Generator and receiver will improve or correct this condition.

i. In aligning or testing a receiver, a modulated signal is frequently used. A modulated signal should not be used, however, with a receiver having an audio system that is not responsive to the modulation frequency.

j. As explained in Par. 5*f*, pure amplitude modulation cannot be obtained with the Model 804-LX Signal Generator. In addition to amplitude modulation, frequency modulation is present, particularly at the high-frequency end of each frequency range. This frequency modulation will be very noticeable in testing selective receivers. It will be observed that the receiver output does not always increase with increased percentage modulation and that additional peaks are observed as the receiver is detuned. Testing of selective receivers should, therefore, be confined to testing with an unmodulated carrier.

k. In aligning or testing a receiver with a modulated signal, an output meter should be employed, connected across the output terminals in parallel with a proper output load. Such a load should consist of a resistor unit, and *not* a pair of telephone receivers, since the impedance of the latter varies with frequency.

l. It is frequently advantageous to listen to the output when tests are being made. A pair of high-impedance phones may shunt a low resistance dummy load with little effect. If no high-impedance phones are available, low-impedance phones may be used in series with a resistor fifteen or twenty times as large as the dummy load.

2. CARRIER OSCILLATOR.

a. The Carrier (R.F.) Oscillator is of the conventional Hartley type. The tuning capacitor (C-14) is permanently connected between grid and plate of the Type 955 Oscillator Tube (V-4). By means of the compact coil-switching mechanism, any one of the six tuning inductors can be connected across the tuning capacitor. The circuit of the Carrier Oscillator is shown schematically in Figure 4-1.

b. The plate voltage is supplied to a center tap on the coil in use, from the CARRIER potentiometer. B+ or B— can be connected to chassis or ground by the use of switch S-5, and the cathode of Type 955 Oscillator Tube, is grounded for radio frequencies by the capacitor C-12.

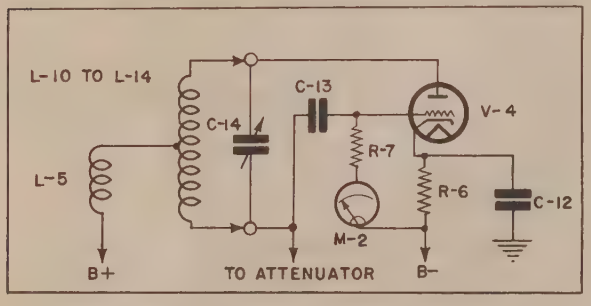


Figure 4-1—Schematic Circuit Diagram of Carrier Oscillator

c. The grid current of the Oscillator Tube is proportional to the amplitude of oscillation and is used to establish the proper level of carrier voltage fed to the Attenuator. The grid current is indicated by the grid current micro-ammeter (M-2, Fig. 7-12) at the right-hand side of the front panel, and is set by varying the CARRIER potentiometer (R-10, Fig. 7-1), which controls the plate voltage applied to the Oscillator Tube.

3. ATTENUATOR.

a. A part of the output voltage of the Carrier Oscillator is applied to the Attenuator (see Fig. 7-1) by means of a capacitive voltage divider (C-17 and C-16) as shown in Figure 4-2. The division is such that approximately one-tenth of the Carrier Oscillator voltage is actually applied to the Attenuator.

b. The voltage appearing across the 100-mmfd. output capacitor (C-15) is varied by means of the series capacitance (part of C-18), controlled by the OUTPUT Dial (E-6, Fig. 7-12) on the panel. This capacitance can be varied from a maximum of about 15 mmfd. to a minimum of about 0.00075 mmfd. These values correspond to the extremes of the OUTPUT Dial calibration, 20 millivolts and one microvolt, respectively.

c. The capacitor C-18 is so constructed that, as the series capacitance is varied, a shunt capacitance is simul-

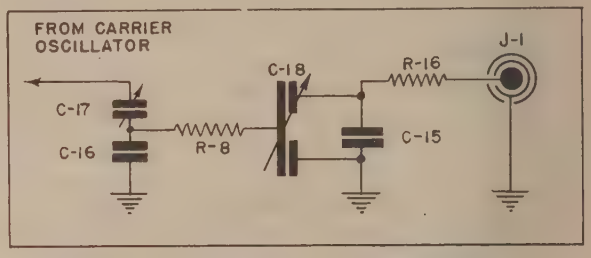


Figure 4-2—Schematic Circuit Diagram of Attenuator

taneously varied to maintain constant the capacitance presented to the input circuit. Variations of Carrier Oscillator frequency with various Attenuator settings are thus avoided.

d. The compensation is adjusted with nine screws which can be seen on the Attenuator housing (see Fig. 7-1). Any readjustment of these screws necessitates recalibration of the Attenuator Dial.

e. A 75-ohm resistor (R-16) is connected in series with the output, to match the impedance of the Coaxial Output Cable.

4. OUTPUT CIRCUIT.

a. The output voltage is obtained at the Coaxial Output Jack (J-1, Fig. 7-12) at the lower right-hand corner of the panel. The output impedance is essentially 75 ohms (R-16) in series with 100 mmfd. (C-15).

b. A 3-foot Coaxial Output Cable (W-1, Fig. 7-10) with a characteristic impedance of about 75 ohms is supplied with the Model 804-LX Equipment. This cable is fitted with male and female connectors and should be inserted into the Output Jack (J-1).

c. The Attenuator OUTPUT Dial (E-6, Fig. 7-12) is calibrated in terms of the open-circuit voltage at the Output Jack (J-1). At high frequencies, the open-circuit voltage at the far end of the Coaxial Output Cable (W-1) is practically that indicated by the dial, but at low frequencies departs considerably from the indicated

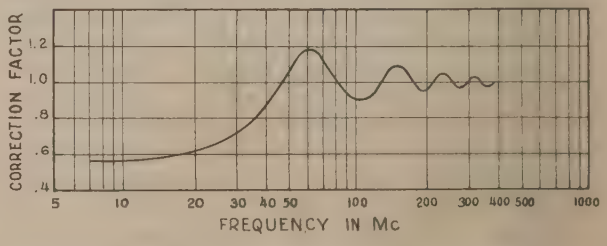


Figure 4-3—Plot of Correction Factor for Open-Circuit Output Voltage as a Function of Frequency

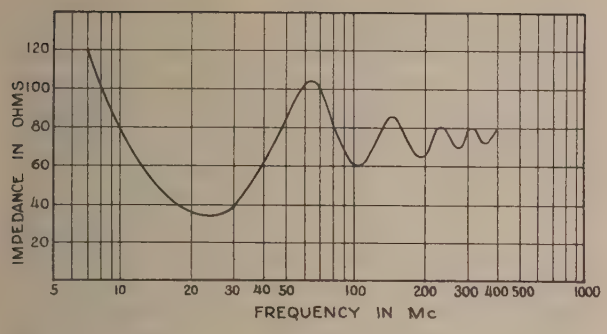


Figure 4-4—Plot of Output Impedance at End of Coaxial Output Cable (W-1) as a Function of Frequency

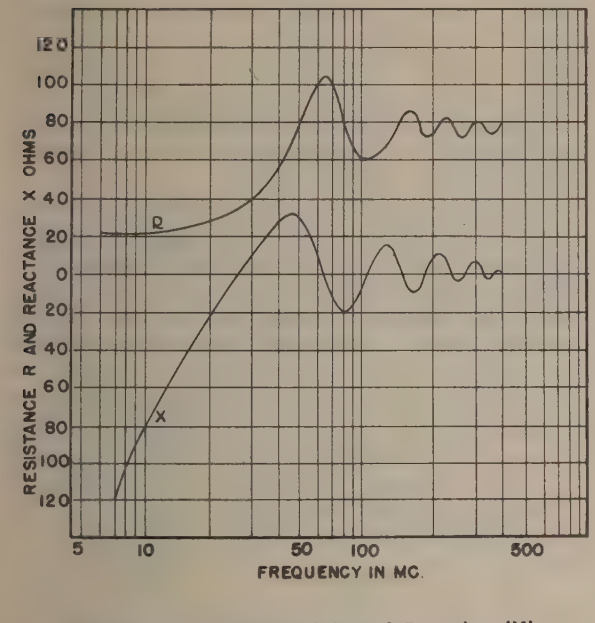


Figure 4-5—Resistive (R) and Reactive (X) Components of Output Impedance

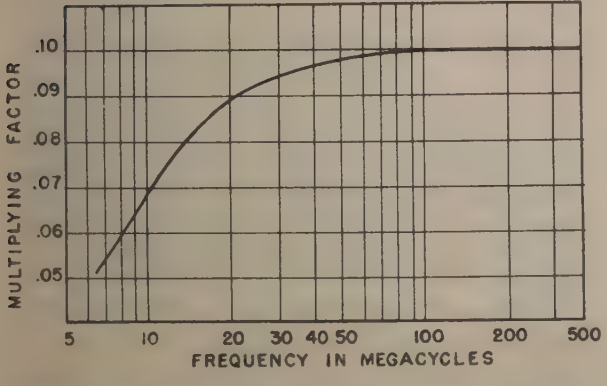


Figure 4-6—Correction Factor for Output Voltage when 10:1 Attenuator Unit (J-201) is Connected to End of Coaxial Output Cable (W-1)

value. The order of magnitude of the variation with frequency is shown by Figure 4-3.

d. The output impedance of the cable approaches 75 ohms at high frequencies, and corresponds to 165 mmfd. at low frequencies (100 mmfd. from C-15 and 65 mmfd. from the cable).

e. Between the extremes of high and low frequency the output impedance varies in a manner indicated by the curves of Figure 4-4 and Figure 4-5.

f. A 75-ohm line is one having a characteristic impedance (or surge impedance) of 75 ohms. The outstanding features of a line that is terminated by its characteristic impedance, or "matched," are:

(1) The input impedance at the open end of the line is equal to the terminating impedance.

(2) None of the transmitted power is reflected back from the terminating impedance. Consequently there are no standing waves present on the line.

(3) Maximum efficiency of power transmission through the line is obtained (minimum loss).

g. The effect of Par. *f* (1) above is usually employed as the definition of the term "characteristic impedance."

h. The fact that the results of Par. *f* (1), (2) and (3) above can be obtained only with a properly terminated line is due to the presence of distributed inductance and capacitance in the line. It is well known that when a line is either "open" (terminated with infinite impedance), or "shorted" (terminated with zero impedance), pronounced reflections and standing waves are observed. With any other termination the reflections and standing waves are reduced, and disappear entirely when the termination is equal to the characteristic impedance.

i. The characteristic impedance of a good concentric line is nearly a pure resistance, and is essentially independent of frequency.

j. Since a discontinuity in a line at a point is the equivalent of an improper termination at that point, discontinuities must be avoided if reflections and mismatches are to be eliminated. For this reason connections made to transmission lines with ordinary leads are not satisfactory at high frequencies, and it is customary to use a plug and jack connection, such as that between the Signal Generator Jack and its Output Cable.

k. Because of its high output impedance, especially on the lower frequency bands, the generator is not suitable for use with a standard dummy antenna.

l. When the Output Cable (W-1) is connected to a 75-ohm impedance the voltage applied to the terminating impedance is one-half the value indicated by the Attenuator Dial, except at low frequencies, where the multiplying factor is five times that shown by Figure 4-6.

m. The 10:1 Attenuator Unit contains a T-pad attenuator (see Figure 4-7) that has an output impedance

of 75 ohms to match the cable, and provides an attenuation of 10:1 at the higher frequencies. At low frequencies the attenuation is greater because of the 100-mmfd. output capacitance of the generator. The multiplying factor to be applied to the OUTPUT Dial reading, when the 10:1 Attenuator Unit (J-201) is used, is plotted in Figure 4-6 as a function of frequency.

n. The 10:1 Attenuator Unit (J-201) may be connected between the Coaxial Output Cable (W-1) and

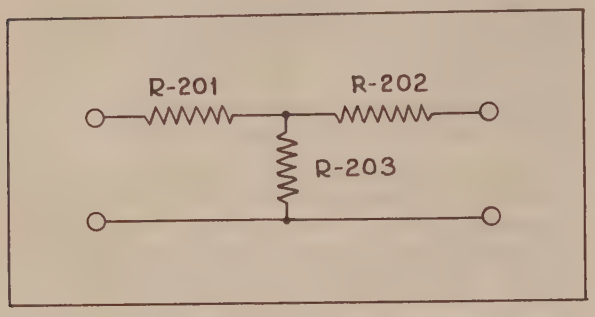


Figure 4-7—Schematic Circuit Diagram of the 10:1 Attenuator Unit (J-201)

the receiver jack when an additional voltage attenuation of ten times is desired. The 10:1 Attenuator Unit has the further advantage of insuring a 75-ohm termination for the Coaxial Output Cable, regardless of the receiver input impedance.

o. The 10:1 Attenuator Unit has a 75-ohm output impedance. However, it can be used with good results in receivers designed for impedance of 50 to 100 ohms.

5. NORMAL MODULATION.

a. Reference to Figure 4-8 shows that like the Carrier Oscillator the internal Modulation Oscillator utilizes the Hartley circuit. The frequency of oscillation is 1000 cycles per second ±5 per cent, determined by the inductor L-4 (see Fig. 7-3) and the capacitor C-8.

b. The Modulation Oscillator delivers about 70 volts (r.m.s.) to the MODULATION potentiometer (R-9). Any desired fraction of this voltage can be inserted in series with the direct-current plate supply of the Carrier Oscillator Tube (V-4). Since the plate supply is regulated at 150 volts, the percentage of modulation that is obtained is directly proportional to the amount of modulating voltage introduced, and is independent of the actual plate voltage at the Carrier Oscillator Tube which is determined by the position of the CARRIER potentiometer (R-10).

c. The percentage of modulation is read directly on the left-hand panel meter (M-1, Fig. 7-12). This is a copper-oxide-rectifier type of meter, 7.5 volts full scale, that is connected to read about one-tenth of the modulating voltage, but is calibrated to read directly the percentage modulation.

d. The modulation circuits are controlled by the MODULATION switch knob (E-5, Fig. 7-12) on the panel. With this switch in the OFF position, the Modulator Tube (V-3) is inoperative. For the INT. position the 1000 cycle oscillator functions in the manner described above. For the EXT. position the Modulator Tube functions as an amplifier, with the MODULATION potentiometer acting as the plate load.

e. The Signal Generator can be modulated with an external audio frequency source, connected to the EXT. MOD. terminals. Approximately seven volts must be applied to obtain 50 per cent modulation. The input impedance is of the order of 0.25 megohm. The modulation characteristics are linear within ± 1 db. over the frequencies 200-10,000 cycles.

f. The amplitude modulation accomplished by varying the plate voltage of the Carrier Oscillator Tube (V-4) is accompanied by a certain amount of frequency modulation. The amount of this frequency modulation increases with carrier frequency and is inversely proportional to tuning condenser capacitance. Recognition of the presence of this frequency modulation must be made when testing selective receivers, particularly at the higher frequencies (see Par. 1*j*).

g. When an unmodulated signal is being used for sensitivity measurements, it is customary to measure the D.C. output of the second detector, as there will be no audio. A sensitive high-resistance D.C. vacuum-tube voltmeter is satisfactory. Many detectors also have R-F voltages present in the output, because of the difficulty

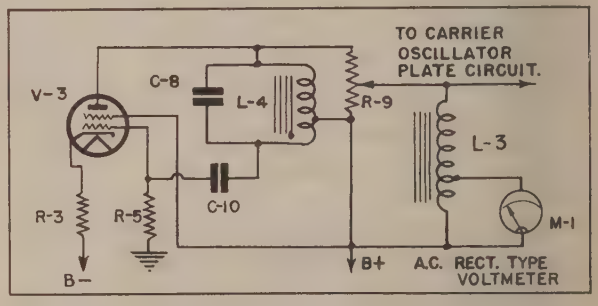


Figure 4-8—Schematic Circuit Diagram of Modulation Oscillator

of building an effective R-F filter that will not attenuate the high-frequency components. In this case an isolating resistor of the order of a megohm is used, connected as close to the detector load as possible, and in series with the voltmeter, to prevent the input capacity of the voltmeter and its leads from detuning the last I.F. circuit.

h. The use of an external video signal generator to modulate the Model 804-LX equipment is advisable for testing special types of receivers having their outputs impressed on oscilloscopes rather than on earphones or loud-speakers. The instruction books of such a generator will give full operating instructions.

6. POWER SUPPLY.

a. The Power Supply, shown schematically in Figure 4-9, is of conventional design and provides the necessary plate and filament voltages to the Oscillator and Modulator Tubes. The plate voltage is stabilized at 150 volts by a VR-150-30 gaseous regulator tube. Either the positive or negative side can be grounded by the use of the switch S-5.

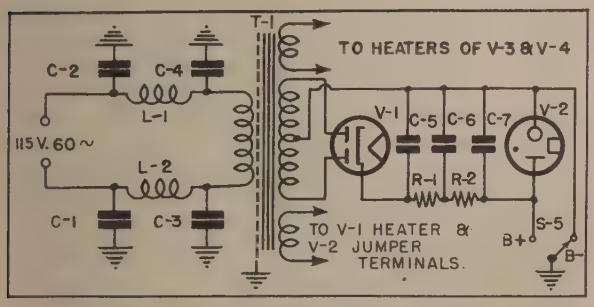


Figure 4-9—Schematic Circuit Diagram of Power Supply

b. When the Model 804-LX equipment is operated from a line having one side "grounded," a small leakage current can flow through the by-pass capacitors of the power line filter unit to the panel and thence to ground through any circuit that happens to be connected between the panel and ground. The current is very small (about 80 microamperes at most), but it is, nevertheless, sufficient to cause a small spark when the ground connection is broken. Also, a slight and entirely harmless shock can be experienced by an operator who happens to touch a grounded object and the cabinet simultaneously.

c. To remedy the foregoing situation the panel of the instrument should be connected to "ground" when the equipment is operated on a grounded line (see WARNING, Par. 1).

7. PLUG-IN INDUCTOR FORM.

a. A Plug-In Inductor Form (L) is furnished with the Model 804-LX Signal Generator Equipment. This can be plugged into the Coil Rack of the range changing switch (S-3) in a position corresponding to the blank sector of the indicator dial. *No winding is furnished.* This position is intended for an additional frequency range. It can be used, for instance, with a fixed shunt capacitance for reduced frequency spread and improved setting accuracy. Owing to the plug-in type of construction, frequencies about 100 Mc. cannot be obtained, but frequencies well below the range of the Signal Generator can be produced. As an example, a plug-in coil to cover the range 2.5 to 7.6 Mc can be made as follows: Wind 44 turns of No. 28 D.S.C. copper wire (close wound) tapped at 22 turns on the spare Plug-In Inductor Form (L). Use a $\frac{3}{8}$" diam. dust core for tuning this range.

8. SENSITIVITY TESTS.

a. Many radio receivers have such an excess of sensitivity provided that at certain frequencies the inherent noise level of the receiver is sufficient to saturate the detector or audio tubes if the sensitivity, volume, or gain control is fully advanced. Therefore, these receivers should be measured and rated for both CW or MCW sensitivity on the basis of the sensitivity, volume or gain control being adjusted so that *not more than 60 microwatts of noise* is present in the output.

b. When a receiver with a regenerative detector is being tested for either CW or MCW sensitivity, the regeneration control should be so adjusted (either to produce stronger oscillations for CW tests or to produce less regeneration for MCW tests) that the output signal voltage (for constant input) is 70 per cent of the maximum (approximately three db down) that can be obtained with critical regeneration or oscillations.

9. STANDARD LEVELS.

a. The *Standard Output Level of Reference* should be six milliwatts.

b. The *Standard Noise Level* should be 60 microwatts.

c. The *Standard Output Load* should be either 600 ohms for low impedance outputs, or 20,000 ohms for high impedance outputs, unless special impedances are provided in the receivers and noted in their instruction books.

10. OUTPUT METER USED AS VOLTMETER.

a. To assist in measurements when the output meter is a voltmeter, the following approximate voltages correspond to the desired wattage at the load impedances noted:

(1) 6 milliwatts { 1.9 volts at 600 ohms
11.0 volts at 20,000 ohms

(2) 60 microwatts { 0.19 volts at 600 ohms
1.1 volts at 20,000 ohms

b. For receivers provided with output meters having a zero level of six milliwatts, —20 db equals 60 microwatts.

c. For receivers provided with output meters having a zero level of 60 microwatts, +20 db equals six milliwatts.

SECTION V
MAINTENANCE

1. GENERAL.

a. The only parts of the Model 804-LX Signal Generator Equipment which are subject to wear or deterioration are the vacuum tubes, the tuning capacitor contacts, and the band-change switch contacts. The calibration of the Carrier Oscillator tuning inductors may drift slightly with age.

b. These notes are meant to aid the operator in maintaining the instrument in first class condition. Examination may be necessary, especially after long usage.

c. In some cases, especially for service and maintenance work, it may be found that few precautions are necessary for satisfactory operation. No rigid rules can be made to cover all cases. Normal functioning of the Attenuator is a good indication of proper grounding.

2. VACUUM-TUBE OPERATING DATA.

a. Tube and circuit voltages under normal operating conditions are given in the Table below. (For location and function of tubes see Sect. I, Par. 4).

b. These measurements were made with a Weston Model 772 Analyzer —20,000 ohms per volt.

3. TROUBLE LOCATION AND REMEDY CHARTS.

a. On the following pages will be found CHART 1—MAINTENANCE PROCEDURE FOR LOCATION AND REMEDY OF TROUBLE, and CHART 2—SPARE PART REPLACEMENT INSTRUCTIONS, which by no means cover everything that could go wrong in the Model 804-LX Signal Generator, but will be found a quick reference guide to recognizing many of the common troubles, the cause and the remedy.

b. These charts include the methods used in removing and replacing any component parts needed in repair which can be done in the field or repair base. The advice contained should be strictly adhered to, as the manufacturer has found these methods to be the correct ones for replacing parts.

c. There are, of course, items which cannot be repaired or replaced, except in the factory or in a laboratory equipped similarly to the factory and using the same exact methods and equipment. These items are indicated on the charts by the word "IMPORTANT" and the advice is contained in the appropriate paragraph.

d. Whenever any parts are replaced by new ones always use the identical type listed and described in Table II, Sect. VI as *made by the manufacturers listed in Column 6 of that table.* If such parts cannot be obtained however, ones having *equivalent electrical and physical characteristics* (within the plus or minus limits as given by Colum 3, Table 11) may be used.

e. Resistance values of parts and spare parts furnished under JAN specifications and as given in Table II, Section VI may vary slightly. The tolerances and values given are the nearest however to JAN specifications.

f. When replacing parts care should be taken to properly mark the part removed and its *exact* position in the equipment so that when the same or a new part is replaced the equipment will be precisely as before. Care should also be taken to see that all connections, soldering etc. are made in a workmanlike manner to assure good electrical performance.

WARNING

When change over is made from 115 volts A.C. to 230 volts A.C. operation, reverse the small nameplate directly under the A.C. inlet receptacle on the cabinet. When shipped it reads: "115 volts—40 to 60 cycles". By removing and reversing the plate it will read: "230 volt—40 to 60 cycles". Also change the nameplate on the top of the cabinet so the line reading "Supply 115/1/40-60" will read "Supply 230/1/40-60."

4. PRACTICAL WIRING DIAGRAMS.

a. At the end of Section VII is a combination schematic and practical wiring diagram (Figure 7-13). The wire and cables used in manufacturing the 804-LX Signal Generator are numbered rather than color-coded. Each end of every wire contains a number in a square box,

VACUUM-TUBE OPERATING DATA

Symbol Designation	*Tube Type No.*	*Heater Voltage*	*Plate Voltage*	*Screen Voltage*	*Plate Current (milliamperes)*	*Screen Current (milliamperes)*
V-1	6X5G or 6X5-GT/G	6.3	290 A.C.	—	—	—
V-2	VR-150-30	—	150	—	25	—
V-3	6G6G	6.3	150	150	10	5
V-4	955	6.3	150	—	2	—

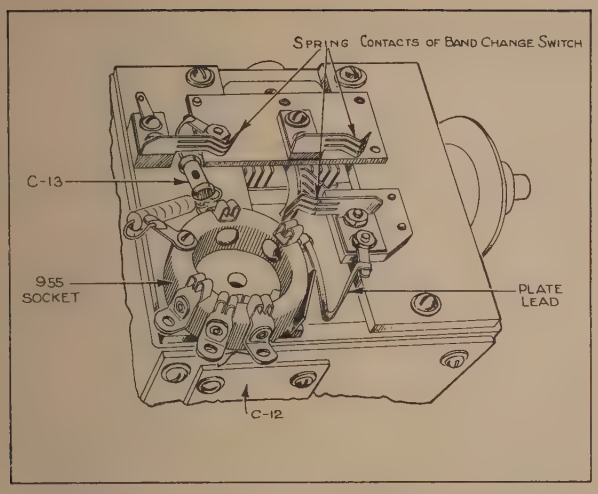


Figure 5-1—Top View of Main Tuning Capacitor (C14)

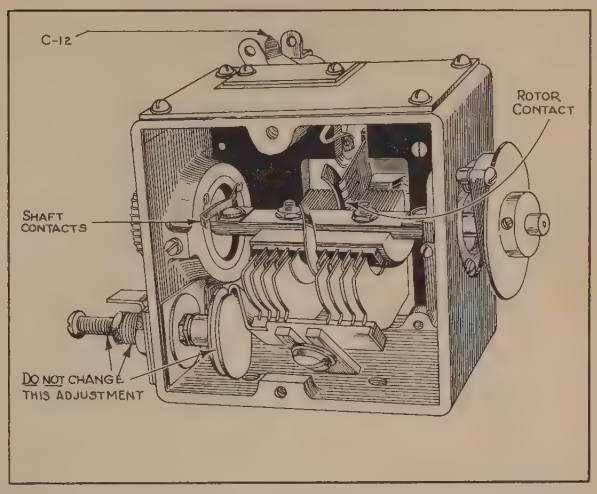


Figure 5-2—Bottom View of Main Tuning Capacitor (C-14) with Cover Removed

(see Figure 7-13) and by making use of this diagram each wire can be traced without the use of any instrument. This makes for simplification of trouble shooting and checking with an absolute minimum of test equipment. By referring to this diagram and to the photographic illustrations (Figures 7-1 to 7-8), it is possible to trace and check every part of the Model 804-LX Signal Generator. A chart is also included showing how to change the Signal Generator over from 115 volts A.C. to 230 volts A.C. operation. (See WARNING Par. 3.)

NOTE

Any items referred to on diagrams and parts list with Nos. 180-0 to 187-0 are parts numbers of Federal Manufacturing & Engineering Corp. of Brooklyn, N. Y., U. S. A.

b. Following Figure 7-13 will be found the regular schematic diagram of the Model 804-LX. This diagram, Figure 7-14 (as well as Figure 7-13), contains the component Symbol Designations which are listed in Table II, Section VI. All this, together with the photographic illustrations (Figures 7-1 to 7-10), will materially aid in locating and ascertaining the function of every part of the equipment, as well as the replacements of parts when necessary. Figure 7-14 also shows the voltages measured from the points designated. The resistance measurements from point to point are also included and are average readings, as obtained from the Weston Model No. 772 Analyzer as indicated in Figure 7-14 and should be about the same for an equivalent type.

5. ELEMENTARY SCHEMATIC DIAGRAM.

a. This diagram (Fig. 5-3) is not meant to be used as a regular schematic diagram of the 804-LX Signal Generator, but only as an aid to show at a glance the general function of the instrument, and its controls and indicating instruments. The regular schematic diagrams are given by Figures 7-13 and 7-14.

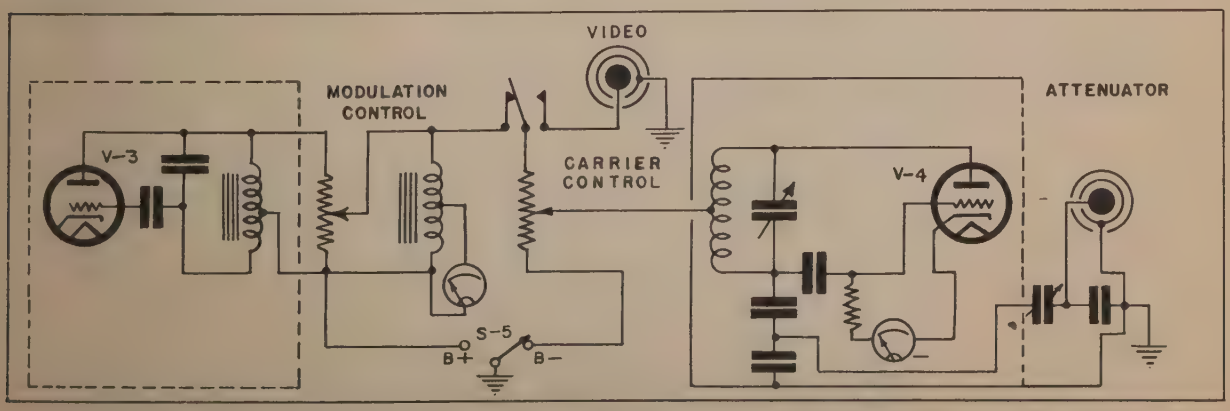


Figure 5-3—Elementary Schematic Diagram of the 804-LX U.H.F. Signal Generator

CAUTION

Any repairs that will affect the calibration of the instrument should not be attempted in the field but the instrument should be returned to the manufacturer.

CHART 1—MAINTENANCE PROCEDURE FOR LOCATION AND REMEDY OF TROUBLE

Type of Trouble	*Remedy*
BAND-CHANGE SWITCH AND CONDENSER CONTACTS.	The band-change switch and the tuning capacitor contacts may become erratic in operation after long use as a result of dust and dirt accumulating on the contacts. (See Figures 5–1 and 5–2). When this occurs the contacts should be carefully cleaned, using a solution of half alcohol and half ether, then wiped dry.
ERRATIC VARIATION IN OUTPUT.	Examine and clean all contacts of the band-change switch, as stated above. Be sure the contact springs make good contact with the switch blades (see Figure 5–1). Remove cover on bottom of main condenser (see Figure 5–2); and clean the rotor and shaft contacts. *Do not bend these contacts so as to reduce the pressure or the frequency calibration will be altered. Be sure these springs make good contact.* Check contacts of Type 955 Oscillator Tube (see Figure 5–1). Try a new Type 955 Oscillator Tube (see Paragraph on "VACUUM TUBES," which follows). Check solder joints and solder terminal screws for looseness.
SUDDEN JUMP IN OUTPUT AS CARRIER CONTROL IS INCREASED.	If the Carrier Meter jumps suddenly upwards, this may indicate the generation of high-frequency parasitic oscillations. Such oscillations may be eliminated by slightly shortening the loop of wire (thin ribbon-like wire) which connects the Oscillator Tube plate to the anchor terminal (see Figure 5–1). Do not shorten this more than necessary, as this process decreases the output and may alter the frequency calibration at the high frequency end of the two highest frequency ranges.
CARRIER METER DOES NOT INDICATE.	If normal carrier signal appears at the Output Jack (J-1), check the Carrier Meter (M-2). The DC full scale current should be 200 microamperes when Signal Generator is tuned anywhere in the range between 7.5 and 100 megacycles. If the Meter is defective, it should be replaced. If, however, no signal appears at the Output Jack (J-1), see Paragraph "VACUUM TUBES," Check resistors, R-14, R-15, R-17 and R-18 (500 ohms) and see that Carrier Meter is not open circuited. Use R×10,000 ohms resistance range on Weston 772 Analyzer for checking meter. Check continuity of choke L-5. The DC resistance should be about 400 ohms. Check the voltages on the Oscillator Tube (V-4). Check condenser C-13 (50 mmfd.) and see that its leakage resistance is greater than 50 megohms. (See Figure 5–1.)
MODULATION METER DOES NOT INDICATE.	Check both internal and external modulation and see if modulation appears on the carrier signal at the Output Jack (J-1). If no modulation is obtained in either case, check Modulation potentiometer and check R-12 and R-13 (500 ohms). Check choke L-3 for continuity, including tap. Check Modulator Tube (V-3) Type 6G6G. Check Modulation Meter (M-1). Full scale voltage should be 7.5 volts A.C. and resistance should be 12,000 ohms. If defective, Meter should be replaced. See that the points of the Modulation switch are clean and are making good contact. If EXTERNAL modulation operates, but INTERNAL does not, check L-4 and the connections to C-8 (0.016 mfd.) and C-10 (0.1 mfd.) and Resistor R-5 (30,000 ohms).
ATTENUATOR.	**IMPORTANT** No attempt should be made to adjust the Attenuator or the Attenuator coupling condenser (C-17, Fig. 7-3) as removal of the Attenuator cover may destroy its calibration. This also applies to the 9 cemented adjustment screws on the Attenuator.
LEAKAGE.	At ultra-high frequencies the problem of leakage becomes acute. Pronounced leakage fields may be produced by a single loose panel screw or a loose meter shield screw. Examine and tighten them all. Also orient set under measurement. See also Sect. II, Par. 2*a;* Sect. IV WARNING, (and paragraphs that follow); and "IMPORTANT NOTICE" at end of CHART 2.

CHART 1—MAINTENANCE PROCEDURE FOR LOCATION AND REMEDY OF TROUBLE (Contd.)

Type of Trouble	*Remedy*
VACUUM TUBES.	The location of the vacuum tubes is given in Sect. I Par. 4. The heaters of all tubes operate on 6.3 volts. Plate voltage and current of the Type 955 Oscillator Tube (V-4) depends on the selected frequency and on the setting of the controls. The maximum values of voltage and current are 150 volts and 10 milliamperes. These values are obtained at the low frequency end of the 120-240 Mc. and 240-330 Mc. bands. The plate current for most of the other ranges is around 5 milliamperes. **CAUTION** If the Type 955 Oscillator Tube (V-4) must be replaced, select a replacement which gives good output at the low end of the 120-240 and 240-330 megacycle band. Check also for any change in frequency calibration at 330 megacycles (see also previous Paragraph, "ERRATIC VARIATION IN OUTPUT"). Plate and screen voltages of the Type 6G6G Modulator Tube (V-3) are 150 volts; in the INT. and EXT. positions of the MODULATION switch. The plate current is about 8 milliamperes and the screen current about 4 milliamperes. The Type VR-150-30 Voltage Regulator Tube (V-2) exhibits a purple glow when in operation. If it does not glow when plate voltage exists replace the tube. The Type 6X5G Rectifier Tube (V-1) and Type 6G6G Modulator Tube (V-3) are not critical and may be replaced without selection.
POWER SUPPLY.	The regulated power supply should deliver 150 volts at about 20 milliamperes to the instrument. The alternating current ripple voltage as measured across the Regulator Tube should not be more than 150 millivolts. This measurement can be made with an output meter.
FREQUENCY CALIBRATION.	Some of the inductors are provided with adjustable dust cores to compensate for slight variations caused by aging. If adjustments have to be made on any of the ranges it is suggested that the frequency in the middle of the range be set accurately. (Standards of 0.5 per cent accuracy or better should be used).
WIRING DIAGRAMS.	In this Signal Generator a standard color code is *not* used in wiring the unit, but instead both ends of each wire have been labelled with the same number. This provides an easy method of tracing both terminations of an individual wire. By referring to the practical wiring diagram (Fig. 7–13)—or the diagram on the inside of the removable cabinet cover—it is possible to trace the wiring without instruments. Repairs can thus be made with the assurance that the proper wire will be replaced at the proper point. The numbers appearing within the squares on Figure 7-13 are the same numbers which will be found on the wire that terminates at the actual units it connects. For example, the diagram shows a wire numbered "47" terminating at modulation choke L-4. It will be found by tracing this wire on the diagram that the other end will terminate at the condenser C-10.
VARIABLE CONDENSER.	**IMPORTANT** Do not remove condenser from panel or touch adjustment of small take-off condenser (C-17, Fig. 5-2) as the frequency calibration and Attenuator calibration will be disturbed and special equipment is needed to realign calibration.
GEARS.	**IMPORTANT** Do not disturb gear settings as this will also disturb frequency calibration, necessitating the use of special equipment to realign.
COILS.	**IMPORTANT** Do not disturb windings, shape or position of the coils on coil rack assembly other than adjusting dust core inside coils should it ever become necessary (see "FREQUENCY CALIBRATION" above on coils).

CHART 2—SPARE PART REPLACEMENT INSTRUCTIONS

(See Sect. V, Par. 3)

Assembly	*Part Symbol*	*Location*	*Instructions*
Vernier Dial	E-2	See Fig. 7-12	Set main dial at 1500. Remove vernier dial. Replace with indicator at 0.
Power Supply Shelf	E-9	See Figs. 7-2, 7-6, 7-7, 7-12	Unscrew dress nut on power switch (S-1, Fig. 7-12) and the three 10-32 nuts inside shelf. Remove power supply from panel studs. (These studs are pressed into panel.) Unsolder four wires shown in Figure 7-7, which go to terminal strip #2 on modulator shelf. (Fig. 7-8). Mount new power supply shelf on panel and replace 10-32 nuts and lockwashers. Replace dress nut on power switch. Solder wires from power supply to terminal strip as follows: Wire #29 to terminal #5 " #31 " " #6 " #14 " " #7 " #15 " " #8
	S-1, S-5	See Fig. 7-12	Remove power supply shelf as directed above but do not unsolder the leads. Then remove switch and replace.
	T-1	See Figs. 7-6, 7-7	Remove power supply shelf as directed above but do not unsolder leads. Loosen the two transformer mounting screws, located on outside of power supply shelf (see Figure 7-7), and remove power transformer.
Octal Socket	X-1	See Fig. 7-6	When replacing X-1 socket, the tube (6X5G) should be inserted into the socket before mounting, so as to prevent the corners of the nuts from interfering with the tube base.
	C-5 C-6 C-7	See Fig. 7-6	Loosen resistor R-1 and R-2 from power supply shelf. Do not unsolder leads. Move resistor aside and snap condenser out of clamp. Pull cable through grommet sufficiently to facilitate replacement.
	C-1 C-2 C-3 C-4	See Fig. -7-7	Insulating bushings must be in place so that screws do not short to shield.
Modulation Meter	M-1	See Figs. 7-2, 7-12	Remove shield cover and unscrew nuts on meter studs. Then unscrew the two meter mounting screws and remove meter.
Modulator Shelf	E-10	See Figs. 7-1, 7-2, 7-3, 7-4, 7-8	Unsolder wires #4, 5, 6, 11, 12 from terminal strip #1 and wires #29, 8, 31, 2, 14, 9, 15 and 10 from terminal strip #2. This disconnects the power supply and panel harness cables. Unsolder lead from R-19 and two wires from pilot light socket from underside of shelf. Set knob in external modulation position and remove same from modulator switch; unscrew the nut and the two cap screws which hold the modulator shelf. With the modulation switch of the new modulator shelf in the same position as the one just removed (extreme counterclockwise position) mount new modulator shelf and replace knob. Resolder wires from panel harness cable to terminal strip #1 as follows: Wire #4 to terminal #1 " #5 " " #2 " #6 " " #3 Wires #11 and #12 " " #4 Resolder wires from power supply cable and the remaining wires from panel harness cable to terminal strip #2 as follows: Wires #29 and #8 to terminal #5 " #31 " #2 " " #6 " #14 " #9 " " #7 " #15 " #10 " " #8

CHART 2—SPARE PART REPLACEMENT INSTRUCTIONS (Contd.)

Assembly	*Part Symbol*	*Location*	*Instructions*
Modulator Shelf (*continued*)	S-2	See Figs. 7-1, 7-12	Remove modulator shelf as directed above but do not unsolder leads from terminal strips. Install new switch and replace shelf. Individual switch blades or transfer blades may be replaced on the switch instead of changing entire unit. However, if transfer switch is disassembled, detent springs must be replaced with enough tension to index the switch properly.
	R-3 R-6	See Figs. 7-1, 7-8	Remove screws of socket (X-4) and raise socket to make resistors accessible.
	C-10	See Figs. 7-3, 7-8	Terminal lugs on new condenser must not short against shield can covering external modulation binding posts.
	C-25	See Fig. 7-3	Mount new condenser so that it will clear the bottom of the cabinet.
	L-3 L-4	See Figs. 7-4, 7-8	Use offset screwdriver to tighten mounting screw under center terminal. (Do not bend terminal.)
External Modulation Terminals	R-11	See Fig. 7-5	Remove modulator shelf as directed but do not unsolder leads. Remove shield cover. Replace modulator shelf as directed.
Oscillator	C-13	See Fig. 5-1	Turn coil turret so that contacts clear soldering iron. Unsolder end connected to X-4 (955 socket) first. Coil contacts must clear new condenser for all positions of coil turret.
	R-7	See Figs. 5-1, 7-4	Soldered to tie point on X-4 (955 Socket).
	X-4	See Fig. 5-1	Do not cut or bend plate lead when removing socket. Resolder plate lead to new socket exactly as it was. Do not over-tighten socket mounting screws since this may strip tapped holes in mycalex stator support on condenser.
Contact Spring for S-3	S-3A	See Fig. 5-1	These make contact with coil turret. All three fingers of this contact spring must touch contacts on the coil turret in all positions and it must slide into position smoothly. Contacts and springs must be free of all grease.
Condenser Rotor Contact for C-14	H-7	See Fig. 5-2	This contact is in the main tuning condenser and replacement may affect the calibration of the instrument. (See "WARNING" at top of CHART 1.)
Carrier Meter	M-2	See Figs. 7-2, 7-12	Same as Modulation Meter.
Video Filter	J-2	See Figs. 7-5, 7-12	Remove the hexagon head cap screw on the panel between the modulation meter and the video socket. Remove the range switch knob (E-1) turn main tuning dial to 1500 on outer scale and remove vernier tuning dial (E-2). Remove dust cover. The video shield cover is held in place by one binding head screw and two hexagon head cap screws behind the dial. Loosen these screws with wrench (the dial will keep them from dropping out) and remove the shield cover. Replace socket. In remounting shield cover put in outside hexagon head cap screw first to hold it in place then tighten rest of screws with the wrench.
	L-101 L-102	See Fig. 7-5	Remove video shield cover as directed above and replace R.F. choke.
	C-101 C-102	See Fig. 7-5	Remove video shield cover as directed above. Remove mica insulators and replace as follows: Insulators #1 and #2 between panel and condenser plate and insulators #3 and #4 between condenser plate and condenser clamp. Replace video shield cover as directed above.
Insertion Unit	R-201	See Fig. 7-9	Cut resistor lead at junction with resistor R-203. Unscrew jack and remove resistor with lug. Solder new resistor to lug and replace in unit. Solder other end in place.

CHART 2—SPARE PART REPLACEMENT INSTRUCTIONS (Contd.)

REMOVING AND REPLACING MAIN FREQUENCY DIAL

Should it ever be necessary to remove the Main Frequency Dial, the following procedure should be followed:

1. Remove the Signal Generator from the cabinet, avoiding bumping, loosening or disturbing any part, as it will affect the calibration or operation of the equipment.

2. Turn the band-change switch so that the 50-120 Mc. band is in position and is centralized with the window. When the 50-120 Mc. band is in position the plug-in coil is at the top of the coil rack.

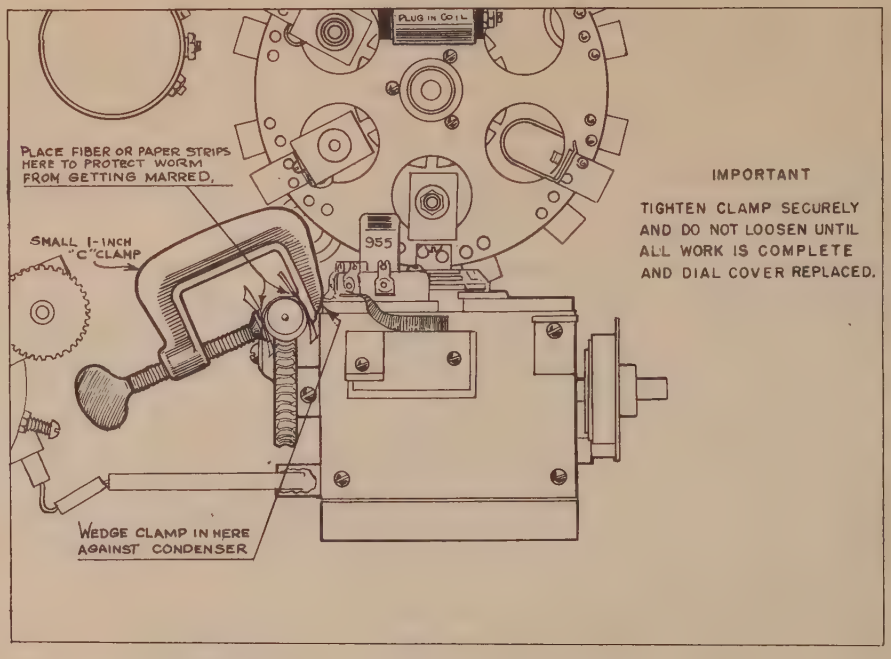

PLUG IN COIL
PLACE FIBER OR PAPER STRIPS HERE TO PROTECT WORM FROM GETTING MARRED.
SMALL 1-INCH "C" CLAMP
955
IMPORTANT
TIGHTEN CLAMP SECURELY AND DO NOT LOOSEN UNTIL ALL WORK IS COMPLETE AND DIAL COVER REPLACED.
WEDGE CLAMP IN HERE AGAINST CONDENSER

Figure 5-4—Rear View of Condenser and Gear Assembly

3. Set the Main Frequency Dial to 1500 (the main tuning condenser is now at minimum capacity). Take a small "C" clamp and clamp the worm drive of the tuning condenser; wedge the "C" clamp against the condenser so that the tuning shaft can no longer turn. Tighten the clamp securely so that it will not loosen. (See Figure 5-4.)

Removing Main Frequency Dial

4. Remove the Vernier Tuning Dial. (The Vernier Dial should be at "0" when the Main Frequency Dial is exactly at 1500.)

5. Remove the band-change switch knob. The band in position is the 50-120 Mc. band. (See Par 2.)

6. Remove the cover for the Main Frequency Dial. This is removed by taking out the four screws at the corners.

CHART 2—SPARE PART REPLACEMENT INSTRUCTIONS (Contd.)

7. Take a small block or straight edge, and with a scriber, mark a line on the panel exactly behind the 1500 line of the main scale. (See Figure 5-5.)

8. Mark a reference line on the vernier pinion hub and the bearing plate of the vernier tuning shaft.

9. Mark a reference line also on the vernier pinion and the idler.

10. Remove the main scale and its mask from the band-change switch shaft. Both of these are removed by loosening the set screws in the mask hub. Notice the assembly of the bronze washers. (See Figure 5-6.)

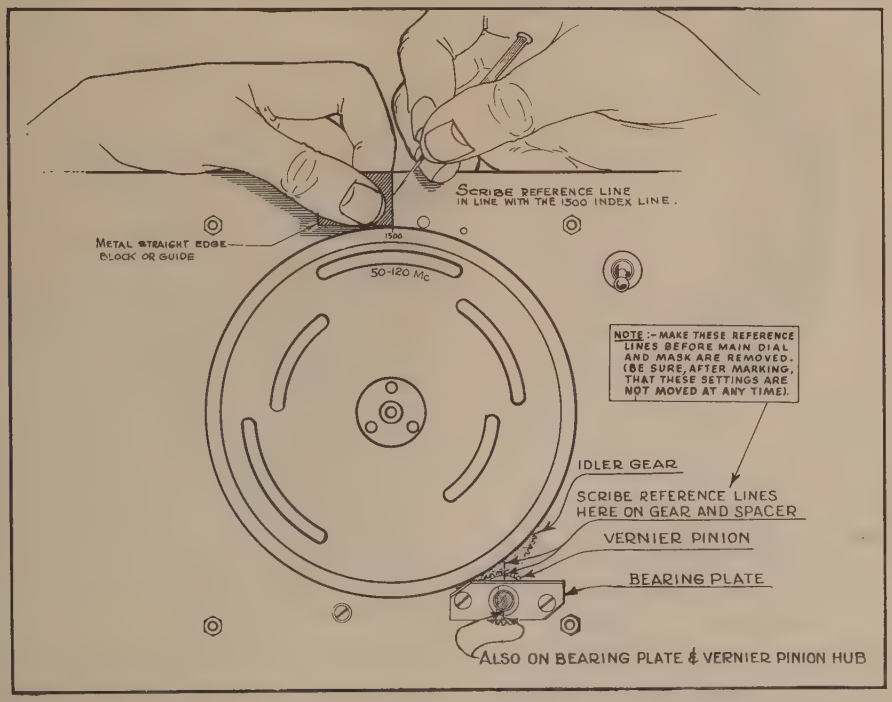

SCRIBE REFERENCE LINE IN LINE WITH THE 1500 INDEX LINE.
METAL STRAIGHT EDGE BLOCK OR GUIDE
1500
50-120 Mc
NOTE :- MAKE THESE REFERENCE LINES BEFORE MAIN DIAL AND MASK ARE REMOVED. (BE SURE, AFTER MARKING, THAT THESE SETTINGS ARE NOT MOVED AT ANY TIME).
IDLER GEAR
SCRIBE REFERENCE LINES HERE ON GEAR AND SPACER
VERNIER PINION
BEARING PLATE
ALSO ON BEARING PLATE & VERNIER PINION HUB

Figure 5-5—Method of Scribing Reference Lines Before Main Frequency Dial Is Removed

To Replace Main Frequency Dial

11. Replace the bronze washers on the mask and dial hubs as noted in Par. 10.

12. Check the reference lines on the vernier pinion hub and the bearing plate and the vernier pinion and the idler gear to see that they still line up. If the "C" clamp holding the worm gear was not disturbed, they are bound to remain in position and the condenser still will be at minimum capacity.

13. Reassemble the Main Frequency Dial and the mask. Care must be taken to mesh the gear on the Main Frequency Dial with the idler gear so that the 1500 line on the Main Frequency Dial will line up with the reference line scribed on the panel. Check this with the block or straight edge used in scribing the line on the panel originally.

14. Tighten the set screws in the mask hub. (Be sure the slot in the mask for 50-120 Mc. band is in the upright position and centrally located in the window of the cover plate. Try this by holding cover over mask and lining up four screw holes.)

CHART 2—SPARE PART REPLACEMENT INSTRUCTIONS (Contd.)

15. Replace the cover for the Main Frequency Dial.
16. Replace the Frequency Range switch knob.
17. Replace the Vernier Dial. Set the dial at "0" and tighten the set screws. (Do not press the indicator too far back, as it may slip off when the dial is turned.)

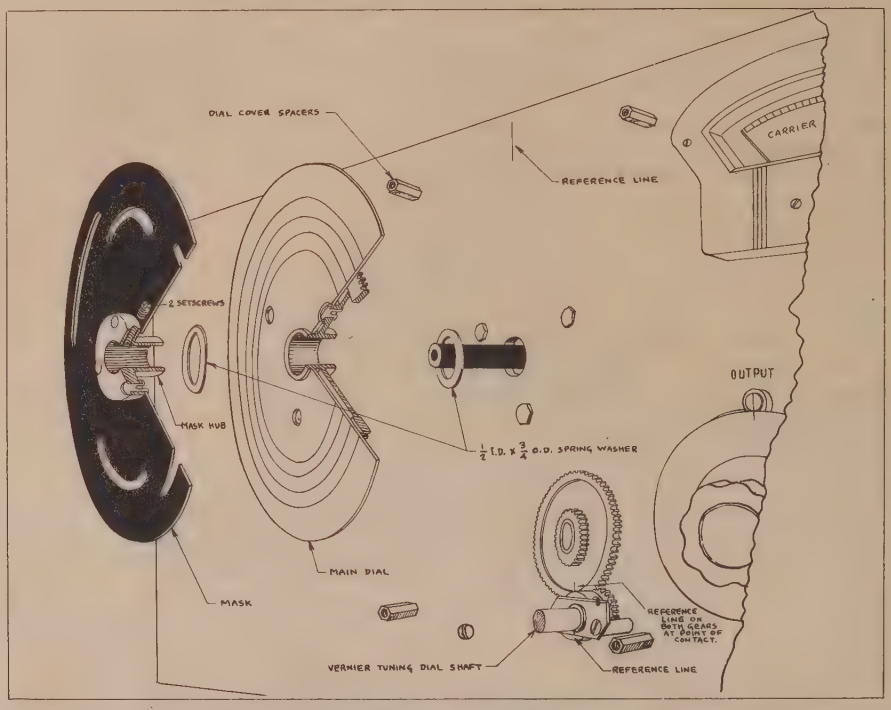


Figure 5-6—Front View of Panel (Dust Cover Removed) Showing Vernier Dial Shaft and Gear Assembly, and Method of Assembling Main Frequency Dial and Mask

IMPORTANT NOTICE

Keep the 14 screws which fasten the panel to the cabinet tight at all times to insure good electrical contact

At the time of manufacture, these panels were surfaced on their rear side to insure a good electrical contact with the mounting angles inside the cabinet. When these instruments have been in use for some time, especially in damp climates, or in salty atmospheric conditions, oxidation may take place between the panel and the mounting angles, which can result in radio frequency leakage.

Should this condition become evident, remove the entire unit from the cabinet and sandpaper around the rear edges of the panel as well as the face of the mounting angles. After cleaning these surfaces, replace the unit in the cabinet. *Be sure to tighten every panel screw securely when replacing.*

SECTION VI
PARTS AND SPARE PARTS LISTS

1. GENERAL.

a. In this section of the Instruction Book for the Model 804-LX Signal Generator Equipment there will be found a complete list of all component electrical parts and replaceable mechanical parts comprising the various units, together with a description of such part and its function. This information is conveniently set forth in several tables appearing on the following pages using the Symbol Designations given in the text, and on the various drawings throughout the book as a means of identifying and locating any particular item, or part. These tables are explained briefly in Par. 2, 3, 4, 5, which follow.

2. LIST OF MAJOR UNITS.

a. A Major Unit, as referenced herein, is defined as a single complete mechanical assembly, capable of a particular function. The Major Units of the 804-LX Signal Generator are listed in Table I below.

3. PARTS LISTS BY SYMBOL DESIGNATIONS.

a. All electrical parts and such mechanical parts to which Navy Type Numbers have been assigned, or which are referred to on the drawings or in the text of this Instruction Book, or for which replacement (including all spare parts) may be required during the service life of the 804-LX Signal Generator are given Symbol Designations. Parts and Spare Parts Lists according to such Symbol Designations are given in Table II.

b. Symbol Designations are made up of a capital letter (identifying the function of the part as listed below) and a significant figure (showing the Major Unit covered and the particular items of the unit). The capital letter portion of the Symbol Designation has the following meaning:

C—Capacitors of all types.
E—Miscellaneous electrical parts, insulators, knobs.
H—Hardware, screws, bolts, etc.
I—Pilot lamps.
J—Jacks and receptacles.
L—Inductors (R-F and A-F).
M—Meters.
N—Nameplates, dials.
P—Plugs.
R—Resistors (fixed and variable), potentiometers.
S—Switches.
T—Transformers.
V—Vacuum tubes.
W—Interconnecting cables, wires, etc.
X—Sockets.

4. APPLICABLE COLOR CODES FOR CAPACITORS AND RESISTORS.

a. The only color code used to identify parts of the 804-LX Signal Generator applies to capacitors and resistors. Table III gives the code which is used.

5. LIST OF MANUFACTURERS.

a. A list of the manufacturers of the various parts of the 804-LX Signal Generator is given in Table IV according to the Key Number in Column 6 of Table II.

TABLE I—LIST OF MAJOR UNITS

Navy Type Designation	Name of Major Unit	Symbol Group or Unit Number	Federal Mfg. & Eng. Corp. Assembly Drwg. No.
CFD-60125	Model 804-LX U.H.F. Signal Generator	1-199	180-0 to 187-0
	Output Cable	W-1	187-60
	A.C. Line Cord	W-2	180-225-1
CFD-631210	10:1 Attenuator Unit	J-201	187-35-3
CFD-49182	Terminal Unit	J-301	187-24-3
CFD-49181	Coaxial Connector Plug	J-3	180-550-1
	Double Plug	P-3	180-190-1

TABLE II—PARTS LIST BY SYMBOL DESIGNATIONS

FOR MODEL 804-LX U.H.F. SIGNAL GENERATOR

Symbol Design.	FUNCTION	DESCRIPTION	Navy Type Number	Navy Spec. or Dwg. No.	Mfg. (See Table IV)	Mfg. Design.	Federal Mfg. & Eng. Corp. Dwg. No.	All Symbol Designations Involved	SPARE PARTS Contract Equip.	SPARE PARTS Contract Tender	SPARE PARTS Contract Stock
		CAPACITORS									
C-1	Power Line Filter Capacitor	CAPACITOR: Fixed; mica; 0.001 mfd ±10%			4	Type 1465	180-118	C-1, C-2, C-3, C-4, C-26			
C-2	Power Line Filter Capacitor	Same as C-1									
C-3	Power Line Filter Capacitor	Same as C-1									
C-4	Power Line Filter Capacitor	Same as C-1									
C-5 C-6 C-7	Power Supply Filter Capacitor	CAPACITOR: Three section; electrolytic; 10 mf/10 mf/5 mf +50% −10%; 350 volts D.C. working			9	Type FPT-370	180-119				
C-8	Modulation Oscillator Tuning Condenser	CAPACITOR: Fixed; mica; 0.015 mfd or 0.016 mfd as required			3	Type 4	180-120-1				
C-9	Power Supply By-pass Capacitor	CAPACITOR: Fixed; paper; wax impregnated; 0.8 mfd ±10%			4	Type 350 or 355	180-121				
C-10	Grid Blocking Condenser for Internal Modulation	CAPACITOR: Fixed; paper; wax impregnated; 0.1 mfd ±10%			4	Type 350 or 355	180-122				
C-11	Audio Input Coupling Condenser	CAPACITOR: Fixed; mica; 0.01 mfd ±10%			3	Type 3L	180-123				
*C-12	Cathode By-pass Condenser for V-4	CAPACITOR: Fixed; mica; 400 mmfd			1	Part of 181-0	Part of 181-0				
C-13	Grid Blocking Condenser for V-4	CAPACITOR: Tubular; ceramic; 50 mmfd ±5%			2	Type 109	180-124				
*C-14	R-F. Oscillator Tuning Condenser	CAPACITOR: Variable; air; 12-150 mmfd			1	Part of 181-0	Part of 181-0				
*C-15	Attenuator Fixed Condenser	CAPACITOR: Fixed; mica; 100 mmfd ±0% −10%			1	Part of 182-40	Part of 182-40				
*C-16	Attenuator Input Voltage Divider	CAPACITOR: Fixed; air; 30 mmfd			1	Part of 181-0	Part of 181-0				
*C-17	Attenuator Input Voltage Divider	CAPACITOR: Variable; air; 2 mmfd			1	Part of 181-0	Part of 181-0				

*C-18	Attenuator Variable Capacitor	CAPACITOR: Special; variable; air; 0-15 and 15-0 mmfd		1	Part of 182-0	Part of 182-0		
C-19	Modulation Meter Filter Capacitor	CAPACITOR: Fixed; mica; 0.00034 mfd ±20%		1	183-4	183-4	C-19, C-20, C-21, C-22	
C-20	Modulation Meter Filter Capacitor	Same as C-19						
C-21	Carrier Meter Filter Capacitor	Same as C-19						
C-22	Carrier Meter Filter Capacitor	Same as C-19						
C-23	Not used							
*C-24	Audio Input Filter Condenser	CAPACITOR: Fixed; mica; 0.0004 mfd ±20%		1	180-214 180-215	180-214 180-215		
C-25	Audio Input Filter Condenser	CAPACITOR: Fixed; mica; 0.0004 mfd ±10%		4	1465	180-125		
C-26	Modulation Meter Filter Capacitor	Same as C-1						
C-27	Modulation Meter Filter Capacitor	CAPACITOR: Fixed; mica; 0.001 mfd ±10%		3	Type 3L-12010	180-126	C-27, C-28, C-29	
C-28	Carrier Meter Filter Condenser	Same as C-27						
C-29	Carrier Meter Filter Condenser	Same as C-27						
C-30 to C-100	Not used							
*C-101	Video Input Filter Condenser	CAPACITOR: Fixed; mica; assembled on panel; 200 mmfd		1	180-231 180-232 180-234	180-231 180-232 180-234		
*C-102	Video Input Filter Condenser	CAPACITOR: Fixed; mica; assembled on panel; 100 mmfd		1	180-231 180-232 180-234	180-231 180-232 180-234		

MISCELLANEOUS ELECTRICAL PARTS: INSULATORS, KNOBS, ETC.

*E-1	Main Frequency Control	KNOB: Molded; phenolic		13	S-310-64-BBEE	180-355		
E-2	Fine Frequency Control	KNOB and DIAL: Vernier Tuning for Main Frequency Control		1	180-365	180-365		
*E-3	MODULATION Control	KNOB: Molded; phenolic		1	S-308-64-BBL	180-356	E-3, E-4	
*E-4	CARRIER Control	Same as E-3						

*If this part is replaced it will change the calibration of the Signal Generator (See Sect. V, Par. 3).

TABLE II—PARTS LIST BY SYMBOL DESIGNATIONS (Continued)

Symbol Design.	FUNCTION	DESCRIPTION	Navy Type Number	Navy Spec. or Dwg. No.	Mfg. (See Table IV)	Mfg. Design.	Federal Mfg. & Eng. Corp. Dwg. No.	All Symbol Designations Involved	SPARE PARTS Contract Equip.	SPARE PARTS Contract Tender	SPARE PARTS Contract Stock
MISCELLANEOUS ELECTRICAL PARTS: INSULATORS, KNOBS, ETC. (Continued)											
E-5	MODULATION (INT-OFF-EXT) Control	KNOB: Molded; phenolic; with pointer			13	S-308-64-40269BB	180-354				
*E-6	Attenuator OUTPUT Control	KNOB and DIAL: Molded; phenolic			1	180-352	180-352				
E-7	Pilot Lamp Jewel	JEWEL ASSEMBLY: Red jewel			1	180-339-1	180-339-1				
E-8	Pilot Lamp Socket	SOCKET ASSEMBLY: Pilot lamp; including E-7			12	No. 50	180-340-1				
E-9	Power Supply	POWER SUPPLY: Complete chassis sub-assembly			1	180-590-1	180-590-1				
E-10	Modulator	MODULATOR UNIT: Complete sub-assembly			1	180-591-1	180-591-1				
E-11	Insulator # 1	INSULATOR: Mica; for C-101, C-102			1	180-239	180-239				
E-12	Insulator # 2	INSULATOR: Mica; for C-101, C-102			1	180-240	180-240				
E-13	Insulator # 4	INSULATOR: Mica; for C-101, C-102			1	180-241	180-241				
E-14	Insulator # 3	INSULATOR: Mica; for C-101, C-102			1	180-242	180-242				
HARDWARE, SCREWS, BOLTS, PINS, ETC.											
H-1	Binding Post Cap for EXT. MOD. Terminals	CAP: Brass, nickel plated			1	180-273-1	180-273-1				
H-2	VIDEO Jack Cover	COVER: Cap and chain assebly for AN connector			1	187-56-1	187-56-1				
H-3	Dust Cover for Main Frequency Dial (N-3)	COVER: Aluminum; 1/16″ x 6 1/4″ x 7″			1	180-285	180-285				
H-4	Handles for Removing Panel from Cabinet	HANDLES: Cast aluminum			1	174-102	174-102				
H-5	Handles for Cabinet	HANDLES: Cast aluminum			1	205-16-1	205-16-1				
H-6	Supporting Feet for Signal Generator	FEET: Rubber, molded			1	184-3	184-3				
H-7	Spring Contact for Rotor of Variable Condenser	SPRING CONTACT: .014″ Elkonium # 18 sheet, full hard			1	181-6-2	181-6-2				

PILOT LAMPS												
I-1	Pilot Light	PILOT LAMP: Mazda; 6.3 volt A.C.; clear; bayonet base			7	Mazda No. 44 clear	180-341					
JACKS AND RECEPTACLES												
*J-1	R-F OUTPUT Jack	JACK: Coaxial			1	180-199	180-199					
J-2	VIDEO Input Jack	JACK: AN coaxial			11		187-44					
J-3	Coaxial Connector Plug	CONNECTOR: Concentric jack at each end			1	180-550-1	180-550-1					
J-201	10:1 Attenuator Unit	INSERTION UNIT: Coaxial terminal			1	187-35-3	187-35-3					
J-301	Terminal Unit	INSERTION UNIT: Coaxial terminal at one end; machine screw terminal at other end			1	187-24-3	187-24-3					
INDUCTORS												
L-1	Power Line Filter Choke	CHOKE: 70 turns #30 D.C.C. wire; wound on 1 megohm IRC BT-2 resistor			1	180-130	180-130	L-1, L-2				
L-2	Power Line Filter Choke	Same as L-1										
L-3	Modulation Choke	CHOKE: Iron core; Federal type laminations; interleaved; 4000 turns #36 enameled copper wire; tapped at 455 turns; inductance 23-30 henries at 1000 cycles with 4 volts A.C. applied across coil			1	180-305-1	180-305-1					
L-4	Modulation Tuning Inductor	CHOKE: Iron core; Federal type laminations; butt joint; 3 air gaps approx. 0.008" each; 1500 turns #31 enameled copper wire; tapped at 600 turns; inductance 1.48 henries at 400 cycles with 10 volts A.C. applied across coil.			1	180-300-1	180-300-1					
L-5	Oscillator Plate R-F Choke	CHOKE: R-F.; 125 turns #38 D.S.C. nichrome wire; wound on 30,000 ohm IRC Type F-1 resistor			1	180-131	180-131					
L-6 to L-9	Not used											
*L-10	Carrier Oscillator Tuning Inductor	INDUCTOR: Tuning; 240-330 Mc.			1	186-8	186-8					
*L-11	Carrier Oscillator Tuning Inductor	INDUCTOR: Tuning; 120-240 Mc.			1	186-9	186-9					

*If this part is replaced it will change the calibration of the Signal Generator (See Sect. V, Par. 3).

TABLE II—PARTS LIST BY SYMBOL DESIGNATIONS (Continued)

Symbol Design.	FUNCTION	DESCRIPTION	Navy Type Number	Navy Spec. or Dwg. No.	Mfg. (See Table IV)	Mfg. Design.	Federal Mfg. & Eng. Corp. Dwg. No.	All Symbol Designations Involved	SPARE PART Contract Equip.	SPARE PART Contract Tender	SPARE PART Contract Stock
		INDUCTORS (Continued)									
*L-12	Carrier Oscillator Tuning Inductor	INDUCTOR: Tuning; 50-120 Mc.			1	186-11	186-11				
*L-13	Carrier Oscillator Tuning Inductor	INDUCTOR: Tuning; 22-50 Mc.			1	186-12	186-12				
*L-14	Carrier Oscillator Tuning Inductor	INDUCTOR: Tuning; 8-22 Mc.			1	186-13	186-13				
L	Carrier Oscillator Tuning Inductor	INDUCTOR: Tuning; Plug-in blank coil form			1	186-36	186-36				
L-15 to L-100	Not used										
L-101	Video Input Filter Choke	CHOKE: Video input filter; 75 turns # 32 enameled copper wire on 1/4" phenolic rod; inductance 10 microhenries			1	180-132	180-132	L-101, L-102			
L-102	Video Input Filter Choke	Same as L-101									
		METERS									
M-1	Percent Modulation Meter	METER: Rectifier type; 0-7.5 volts A.C.			7	Type 8DO 49 XMR-200	185-0-1				
M-2	Carrier Level Meter	METER: 0-200 microamperes D.C.			7	Type 8DO 49 ADE-200	183-0-1				
		NAMEPLATES AND DIALS									
N-1	Type Plate	NAMEPLATE: Brass, nickel plate; 0.025" x 2" x 3"			1	180-570	180-570				
N-2	Acceptance Plate	NAMEPLATE: Brass; nickel plate, 0.025" x 9/16" x 3"			1	211-186	211-186				
N-3	Main Frequency Dial	DIAL: Aluminum; 0.064" x 6" diam.			1	180-287	180-287				

PLUGS											
P-1 P-2	Not used										
P-3	Double Plug for EXT. MOD. Input Terminal	PLUG: Double; insulated			1	180-190-1	180-190-1				
RESISTORS											
R-1 R-2	Power Supply Filter Resistor	RESISTOR:Two section; fixed molded; wire wound; 1250 ohms each section ±10%			10	Type MW2	180-100				
R-3	Cathode Bias Resistor for V-3	RESISTOR: Metalized filament; fixed; 500 ohms ±10%			10	Type BT-½	180-101	R-3, R-11, R-12, R-13, R-14. R-15, R-17, R-18, R-19			
R-4	Grid Resistor for V-3 External Modulation	RESISTOR: Metalized filament; fixed; 500,000 ohms ±10%			10	Type BT-½	180-102				
R-5	Grid Resistor for V-3 Internal Modulation	RESISTOR: Metalized filament; fixed; 30,000 ohms ±10%			10	Type BT-½	180-103				
R-6	Cathode Bias Resistor for V-4	RESISTOR: Metalized filament; fixed; 200 ohms ±10%			10	Type BT-½	180-104				
R-7	Grid Resistor for V-4	RESISTOR: Metalized filament; fixed; 25,000 ohms ±10%			10	Type BT-½	180-105				
R-8	Attenuator Output Series Resistor	RESISTOR: Metalized filament; 30 ohms ±10%			10	Type F-⅓	180-106				
R-9	Modulation Control Potentiometer	POTENTIOMETER: Variable; wire wound; 20,000 ohms ±10%			8	Type K-3695	180-107-2				
R-10	Carrier Control Potentiometer	POTENTIOMETER: Variable; wire wound; 50,000 ohms ±10%			8	Type K-3695	180-108-2				
R-11	Audio Input Filter Resistor	Same as R-3									
R-12	Modulation Meter Filter Resistor	Same as R-3									
R-13	Modulation Meter Filter Resistor	Same as R-3									
R-14	Carrier Meter Filter Resistor	Same as R-3									
R-15	Carrier Meter Filter Resistor	Same as R-3									

*If this part is replaced it will change the calibration of the Signal Generator (See Sect. V, Par. 3).

TABLE II—PARTS LIST BY SYMBOL DESIGNATIONS (Continued)

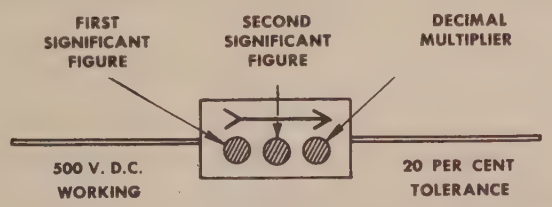
Symbol Design.	FUNCTION	DESCRIPTION	Navy Type Number	Navy Spec. or Dwg. No.	Mfg. (See Table IV)	Mfg. Design.	Federal Mfg. & Eng. Corp. Dwg. No.	All Symbol Designations Involved	SPARE PARTS Contract		
									Equip.	Tender	Stock
RESISTORS (Continued)											
*R-16	Output Resistor	RESISTOR: Carbon resistance unit; 75 ohms ±5%			6	Type 504B	180-109				
R-17	Carrier Meter Filter Resistor	Same as R-3									
R-18	Carrier Meter Filter Resistor	Same as R-3									
R-19	Audio Input Filter Resistor	Same as R-3									
R-20	V-3 Grid Parasitic Suppressor Resistor	RESISTOR: Wire wound; fixed; 100 ohms; ½ watt ±20% or ±10%			10	Type BW-½	180-110				
R-201	Voltage Divider Resistor for 10:1 Attenuator Unit	RESISTOR: Fixed; ceramic, 60 ohms ±5%			6	Type 504B	187-42	R-201, R-202			
R-202	Voltage Divider Resistor for 10:1 Attenuator Unit	Same as R-201									
R-203	Voltage Divider Resistor for 10:1 Attenuator Unit	RESISTOR: 15 ohms, made up of 4 fixed ceramic resistors in parallel (each 60 ohms ±5% same as R-201)									
SWITCHES											
S-1	POWER Switch	SWITCH: D.P.S.T.			7	GA2A23	215-512-1				
S-2	MODULATION (EXT-OFF-INT) Switch	SWITCH: 4 P.D.T.			1	180-175-1	180-175-1				
S-2A	Switch Part for S-2	SWITCH PART: Blade switch transfer			1	180-187-1	180-187-1				
S-2B	Switch Part for S-2	SWITCH PART: Blade switch contact			1	180-186-1	180-186-1				
*S-3	Band-change Switch	SWITCH: Special coil rack			1	186-0	186-0				
S-3A	Switch Part for S-3	SWITCH PART: Spring contact			1	181-45-3	181-45-3				
S-4	VIDEO—NORMAL OPERATION Switch	SWITCH: S.P.D.T.			7	GA3C22	215-506-1	S-4, S-5			
S-5	NEGATIVE GROUND —POSITIVE GROUND Switch	Same as S-4									

TRANSFORMERS											
T-1	Power Supply Transformer	TRANSFORMER: Iron core; Federal type laminations: *Primary:* #1 and #2 each 825 turns #30 enameled copper wire. *Secondary:* #1 and #2 each 51 turns #23 enameled copper wire; #3 3930 turns #35 enameled copper wire, tapped at 1965 turns. Open circuit voltages: *Primary:* 115 volts *Secondary:* #1, #2 } 7.1 volts #3 548 volts			1	180-293-6	180-293-6				
VACUUM TUBES											
V-1	Power Supply Rectifier Tube	TUBE: Full wave high vacuum rectifier; Type 6X5G or 6X5-GT/G			5	6X5G or 6X5-GT/G					
V-2	Voltage Regulator Tube	TUBE: Voltage regulator; Type VR-150-30			5	VR-150-30					
V-3	Modulator Tube	TUBE: Power amplifier pentode; Type 6G6G			5	6G6G					
V-4	Oscillator Tube	TUBE: Acorn type triode; Type 955			5	955					
INTERCONNECTING CABLES											
W-1	Coaxial Output Cable	CABLE: Three foot shielded cable with coaxial terminals			1	187-60	187-60				
W-2	A.C. Line Cord	CABLE: Motor attachment cord and plug assembly			7		180-225-1				
SOCKETS											
X-1	Rectifier Tube Socket	SOCKET: Octal			1	180-338-1	180-338-1	X-1, X-2, X-3			
X-2	Voltage Regulator Tube Socket	Same as X-1									
X-3	Modulator Tube Socket	Same as X-1									
X-4	Oscillator Tube Socket	SOCKET: Acorn tube; Type 955			1	180-260-1	180-260-1				

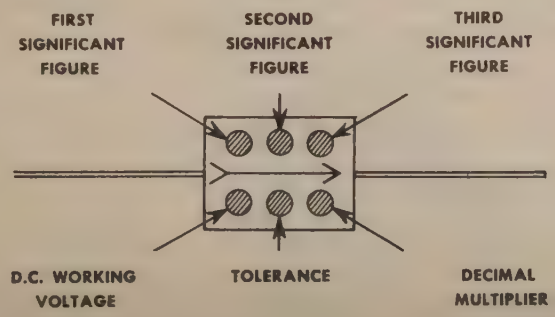
*If this part is replaced it will change the calibration of the Signal Generator (See Sect. V, Par. 3).

TABLE III—APPLICABLE COLOR CODES FOR CAPACITORS AND RESISTORS

RMA COLOR CODES FOR CAPACITORS (MMFD)



COLOR	NUMERAL	VOLTS	MULTIPLIER	TOLERANCE
BLACK	0		1	
BROWN	1	100	10	1%
RED	2	200	100	2%
ORANGE	3	300	1,000	3%
YELLOW	4	400	10,000	4%
GREEN	5	500	100,000	5%
BLUE	6	600	1,000,000	6%
VIOLET	7	700	10,000,000	7%
GRAY	8	800	100,000,000	8%
WHITE	9	900	1,000,000,000	9%
GOLD		1000	0.1	5%
SILVER		2000	0.01	10%
NO COLOR		500		20%

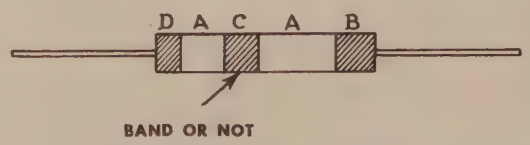


RMA COLOR CODE FOR RESISTORS (OHMS)

COLOR	A 1ST DIGIT	B 2ND DIGIT	C MULTIPLIER
SILVER			0.01
GOLD			0.1
BLACK		0	1.0
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
PURPLE	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	

D—TOLERANCE CODE:

GOLD = 5% SILVER = 10% NO COLOR = 20%



OLD COLOR ARRANGEMENT

NEW COLOR ARRANGEMENT

BODY COLOR (New Color Arrangement Only)—Indicates Type of Resistor as Follows:

BLACK—Composition, Non-Insulated.
TAN, OLIVE OR WHITE—Composition, Insulated.
DARK BROWN—Wire-wound, Insulated.

TABLE IV—LIST OF MANUFACTURERS

(Key Number refers to Column 6 Table II)

Key Number	Mfr. Prefix	Manufacturers Name	Address
1	CFD	Federal Manufacturing & Engineering Corp.	Brooklyn, N. Y.
2	—	Centralab Mfg. Co.	Milwaukee, Wisc.
3	CD	Cornell-Dubilier Corp.	South Plainfield, N. J.
4	CAW	Aervox Corp.	New Bedford, Mass.
5	CRC	R.C.A. Mfg. Co.	Harrison, N. J.
6	CER	Erie Resistor Corp.	Erie, Pa.
7	CG	General Electric Co.	Schenectady, N. Y.
8	CMC	Clarostat Mfg. Co.	Brooklyn, N. Y.
9	CMA	P. R. Mallory & Co., Inc.	Indianapolis, Ind.
10	CIR	International Resistance Corp.	Philadelphia, Pa.
11	CI	Connectors, Inc.	Philadelphia, Pa.
12	—	Drake Mfg. Co.	Chicago, Ill.
13	—	Kurz-Kasch Co.	New York, N. Y.

SECTION VII

PHOTOGRAPHS AND DRAWINGS

1. GENERAL.

a. The photographic illustrations and drawings which appear on the following pages are divided into five groups as follows:

(1) Figures 7-1 to 7-8 inclusive show various *interior* views of the 804-LX Signal Generator.

(2) Figures 7-9 and 7-10 show the operating accessories furnished with the equipment, namely:

Terminal Unit (J-301) and 10:1. Attenuator Unit (J-201)—Figure 7-9.

Coaxial Output Cable (W-1), A.C. Line Cord (W-2), Double Plug (P-3), and Spare Pilot Lights—Figure 7-10.

(3) Figure 7-11 shows the method of stowing the Coaxial Output Cable (W-1), A.C. Line Cord (W-2), and Double Plug (P-3) on the panel of the Signal Generator.

(4) Figure 7-12 is a panel view of the 804-LX Signal Generator showing all operating controls and indicating parts. Constant reference is made to this figure throughout Section III—OPERATION and Section IV—THEORY OF OPERATION and it therefore is printed on a fold-in page for the convenience of the reader.

(5) Figures 7-13 and 7-14 are wiring diagrams. The first is a practical wiring diagram, while the second is the standard engineering type of schematic drawing.

b. The practical wiring diagram (Fig. 7-13) is discussed in Section V—MAINTENANCE. As is there stated the wires and cables used in manufacturing the Signal Generator are numbered rather than color coded. Each end of every wire contains a number in a square box, and by making use of the diagram each wire can be traced without the use of any instrument.

c. Reference is also made to the practical wiring diagram (Fig. 7-13) at many places throughout the Instruction Book, especially in Section IV—THEORY OF OPERATION and Section V—MAINTENANCE, and it is for the convenience of the reader that it is printed on a fold-in page at the back of the book.

d. All the individual component parts and units shown by the above photographic illustrations and drawings are identified by the Symbol Designations used throughout the text of the Instruction Book and will be found fully listed in Section VI—PARTS AND SPARE PARTS LISTS.

2. QUICK REFERENCE DATA LIST.

a. Opposite the practical wiring diagram (Fig. 7-13) will be found QUICK REFERENCE DATA—ELECTRICAL PARTS. This list provides conveniently located data on capacitors, inductors, resistors, etc., but is not intended to take the place in any way of the PARTS LIST BY SYMBOL DESIGNATIONS given by Table II, Section VII.

b. To make the same QUICK REFERENCE DATA—ELECTRICAL PARTS available for ready reference with any of the illustrations in the Instruction Book it appears again on the fold-in page showing Figure 7-12.

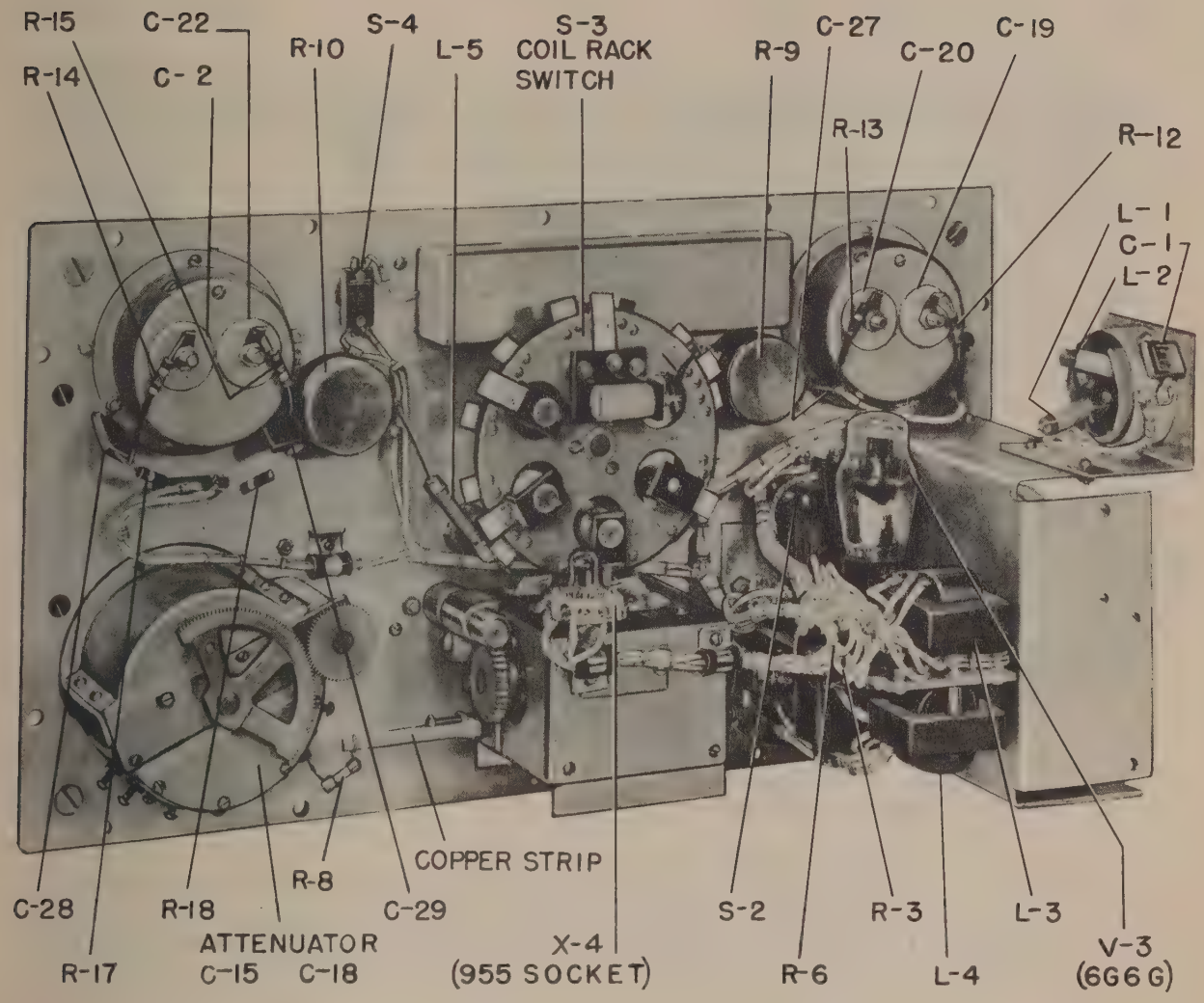


Figure 7-1—Interior View of the Signal Generator with Meter Shield Covers Removed (Viewed from the Left)

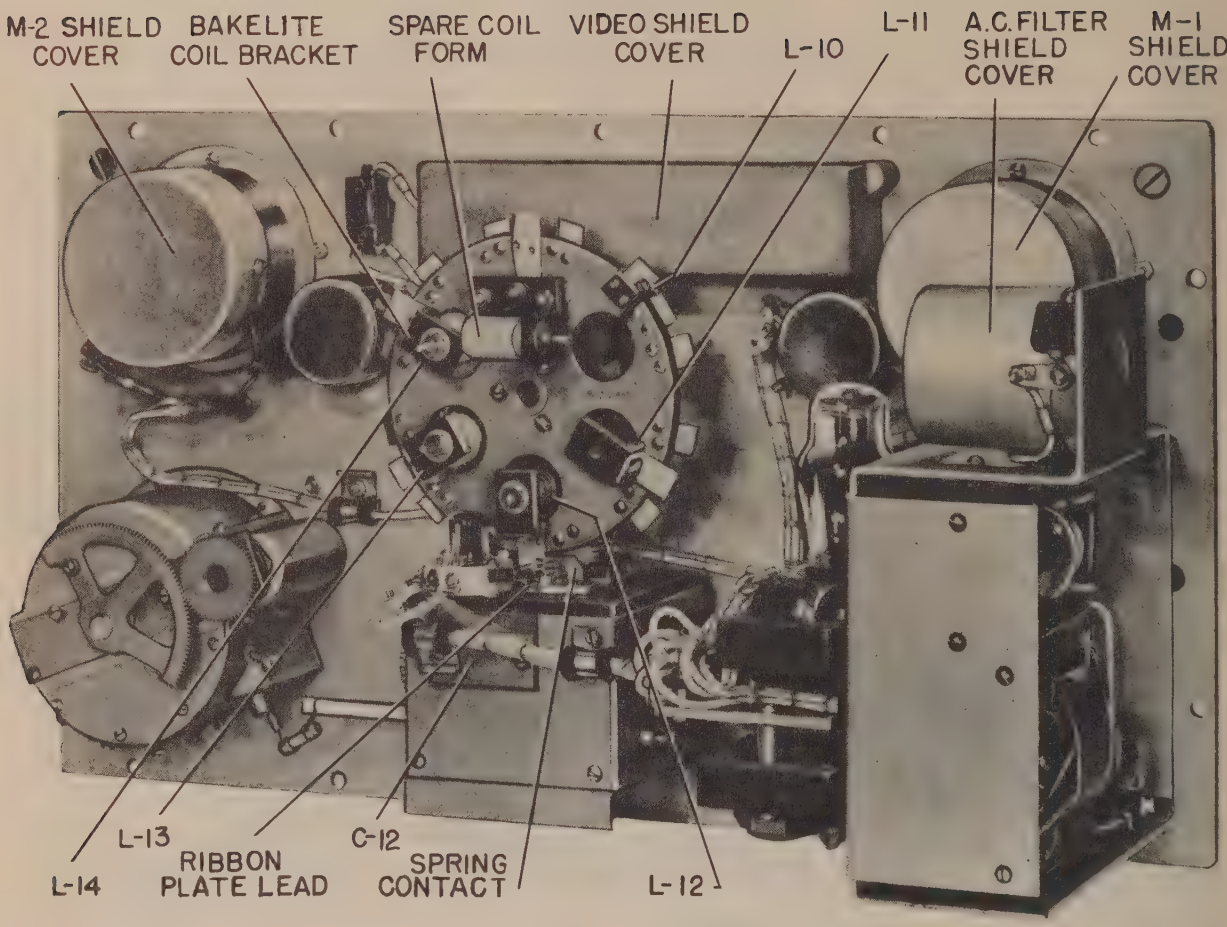


Figure 7-2—Interior View of the Signal Generator with Meter Shield Covers in Place (View from the Right)

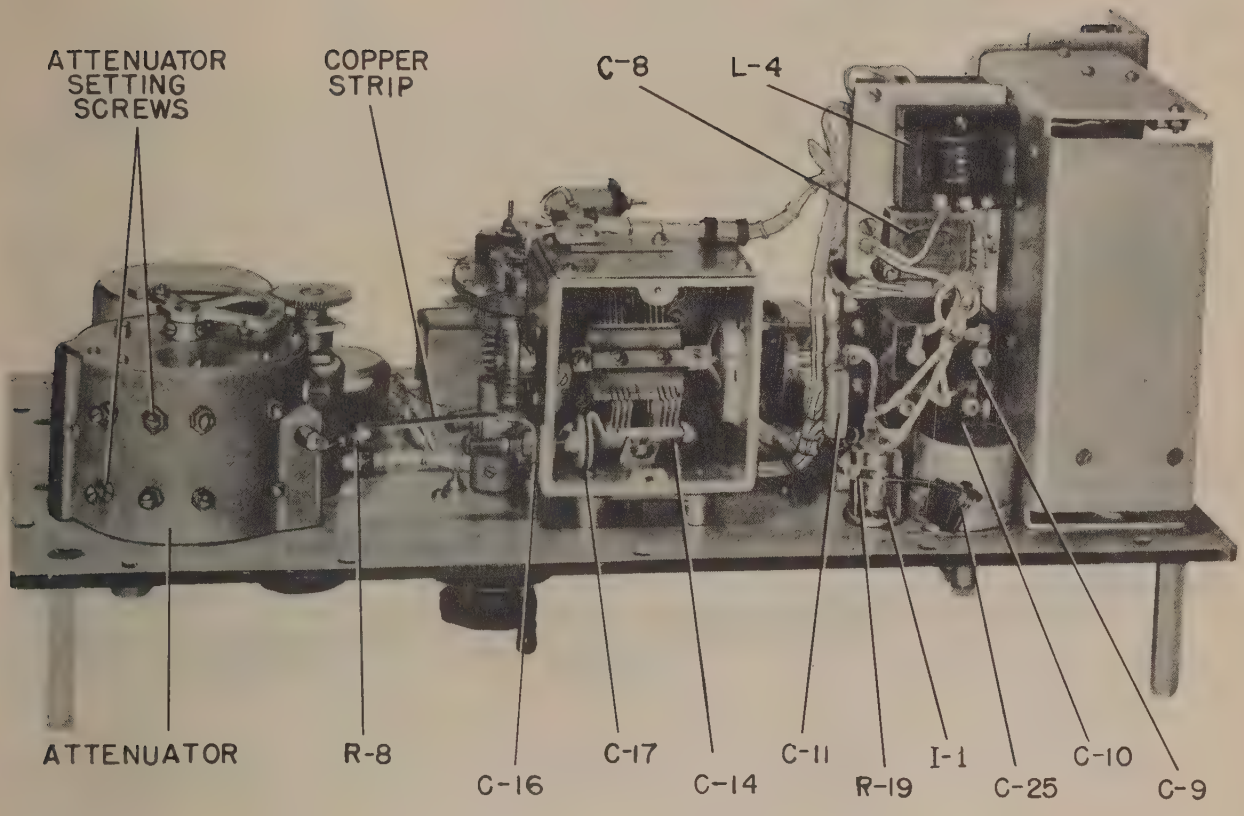


Figure 7-3—Interior View of the Signal Generator with Cover Plate of Variable Condenser Removed (Viewed from Underneath)

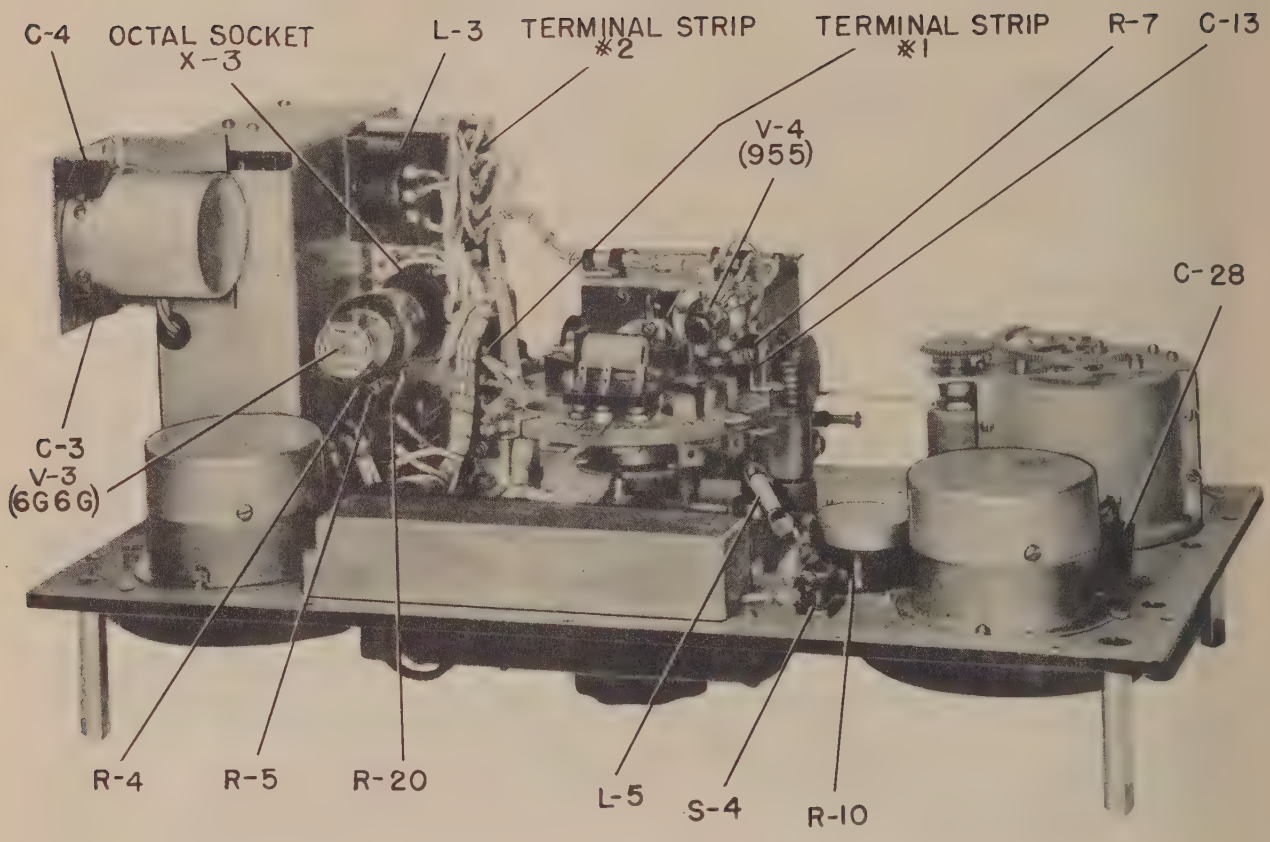


Figure 7-4—Interior View of the Signal Generator with All Shield Covers in Place (Viewed from the Top)

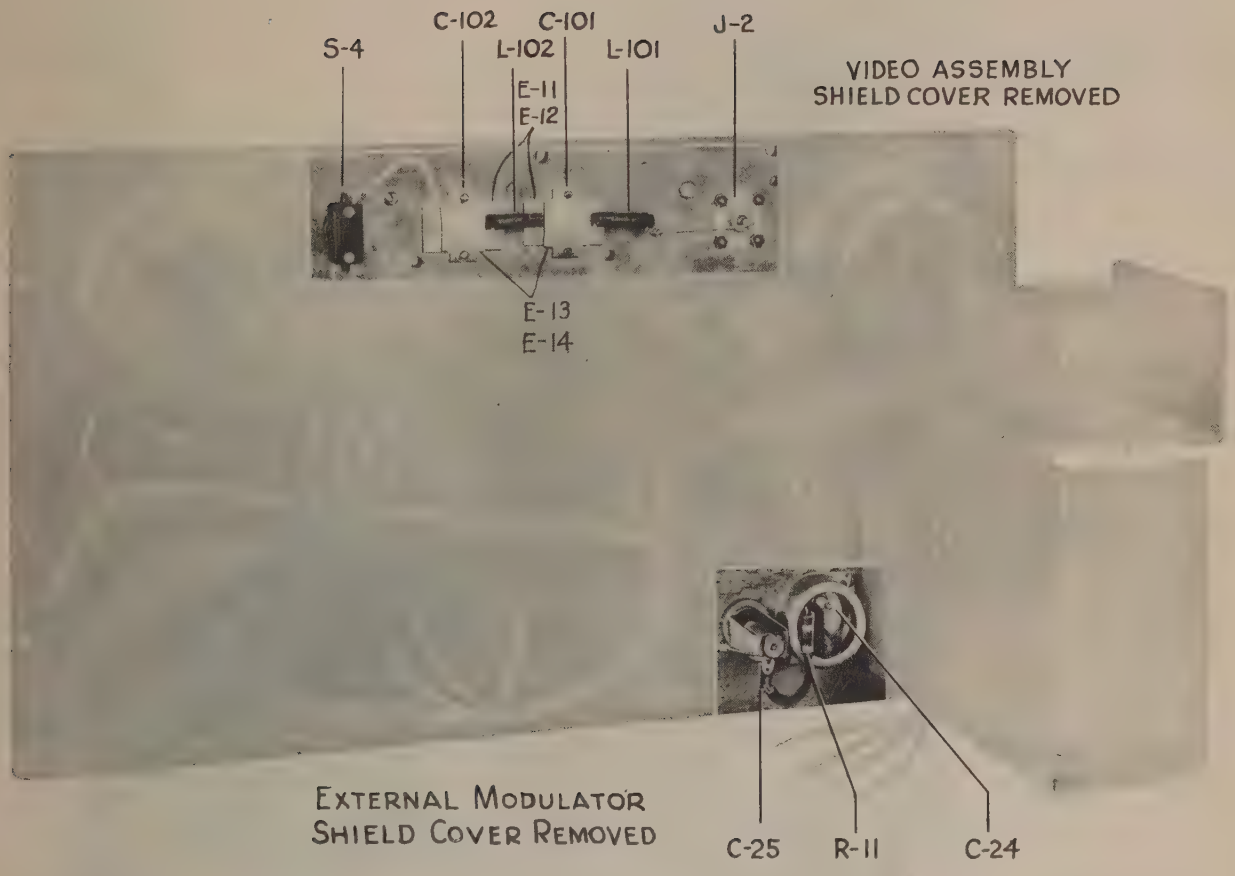


Figure 7-5—Rear View of Video Assembly with Shield Cover Removed, Also Rear View of External Modulator Assembly with Shield Cover Top Removed

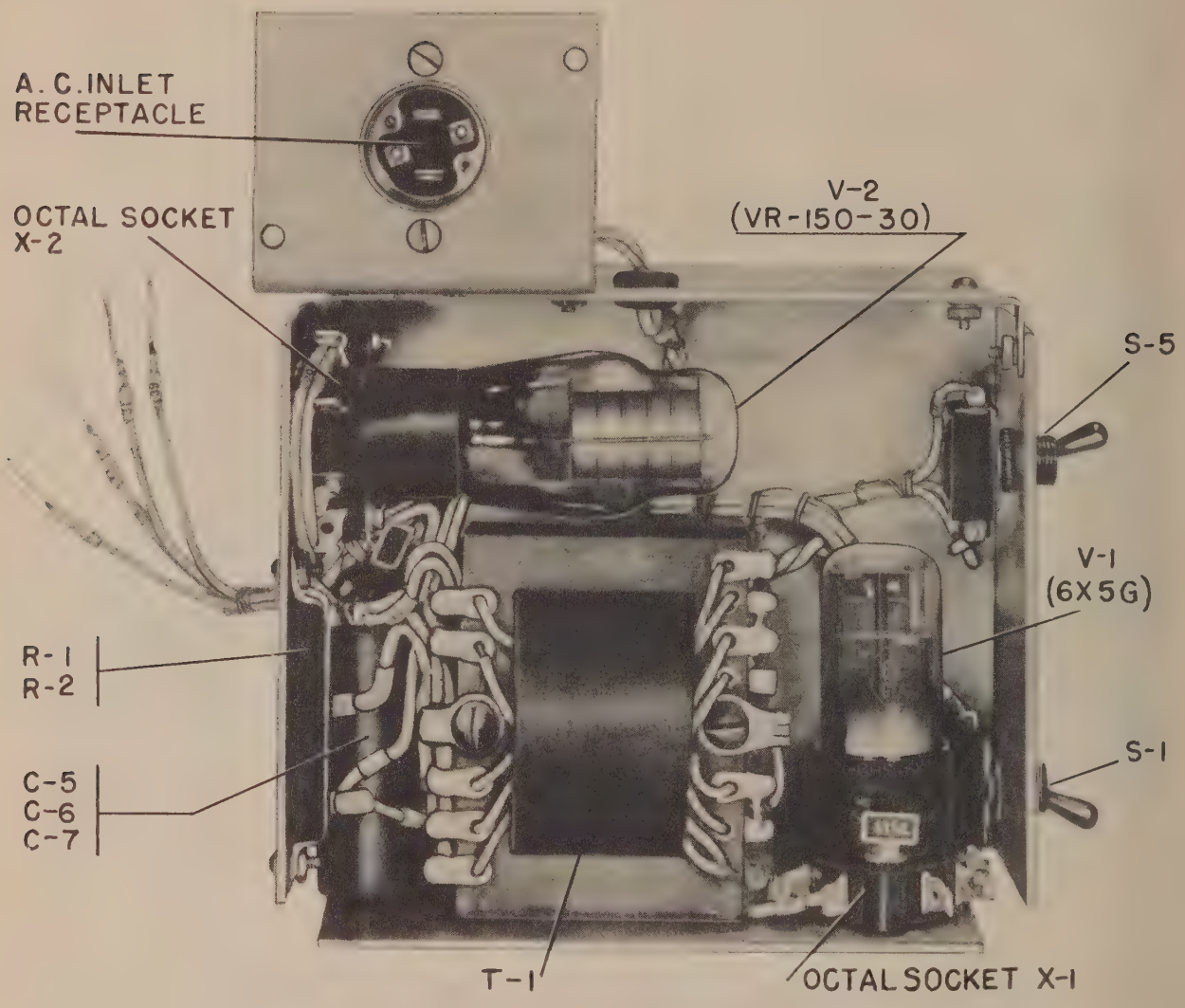


Figure 7-6—Side View of Power Supply Chassis (E-9)

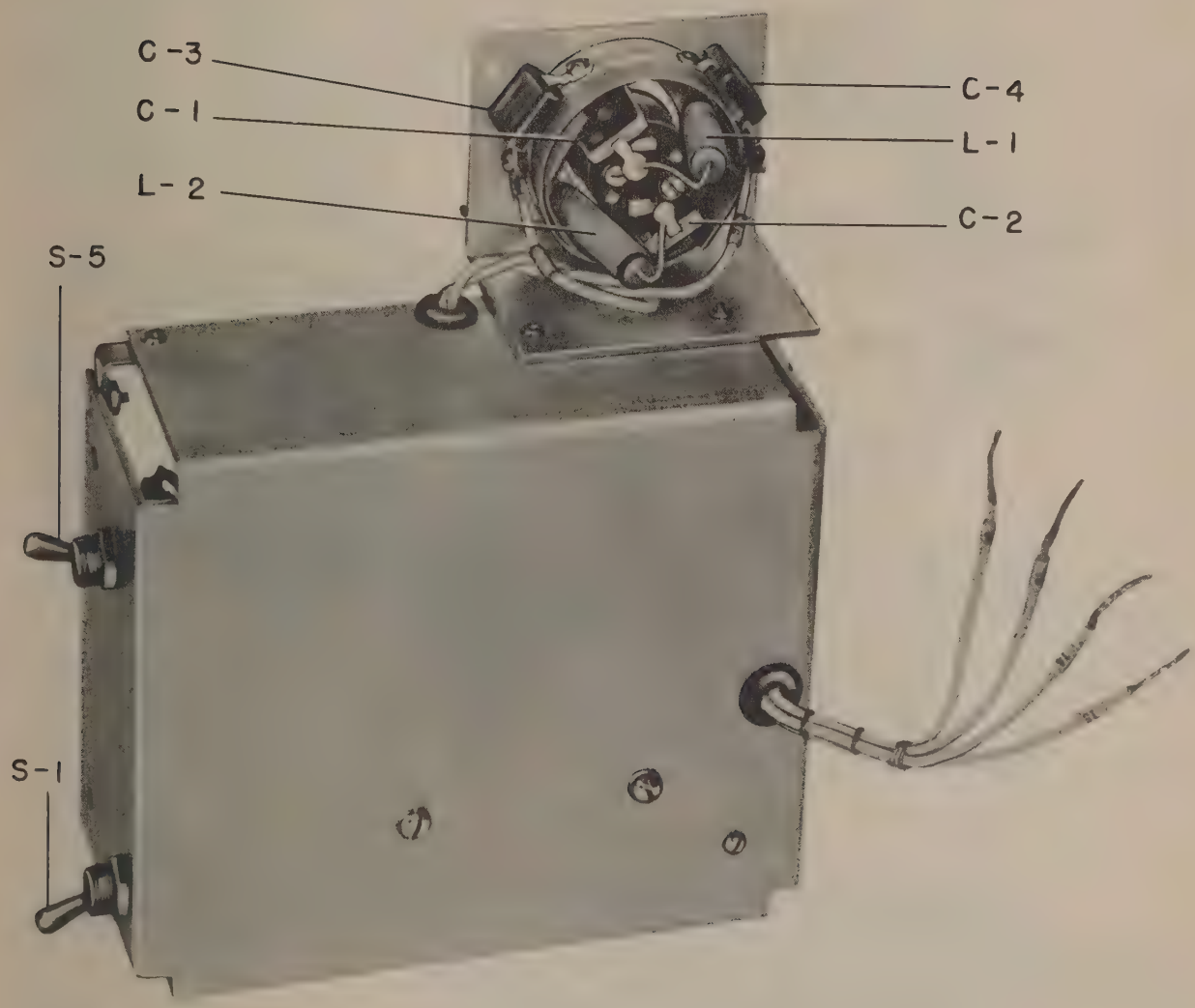


Figure 7-7—Top and Rear View of Power Supply Chassis (E-9) with A.C. Line Filter Cover Removed

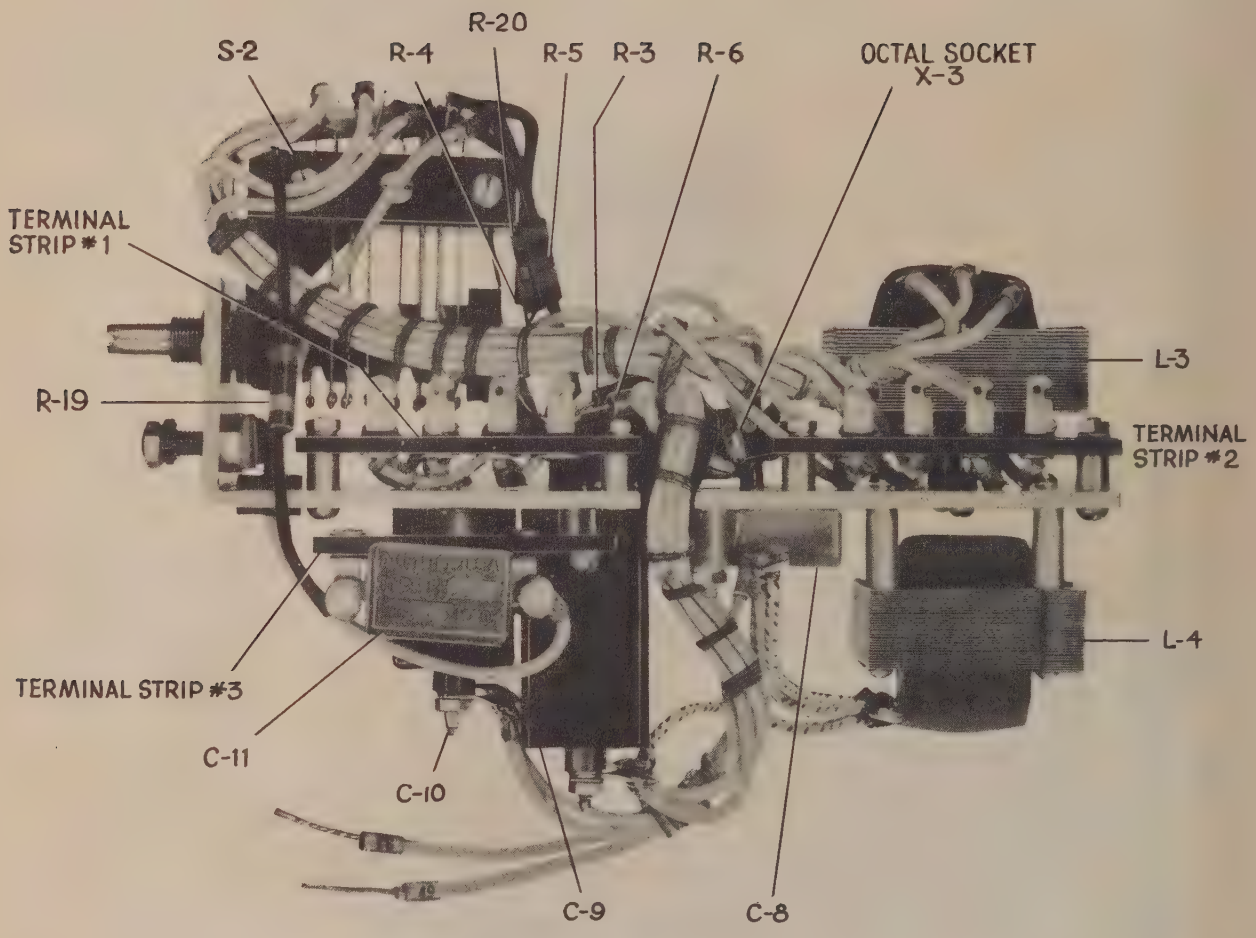


Figure 7-8—View of Wired Modulator Unit Sub-Assembly (E-10)

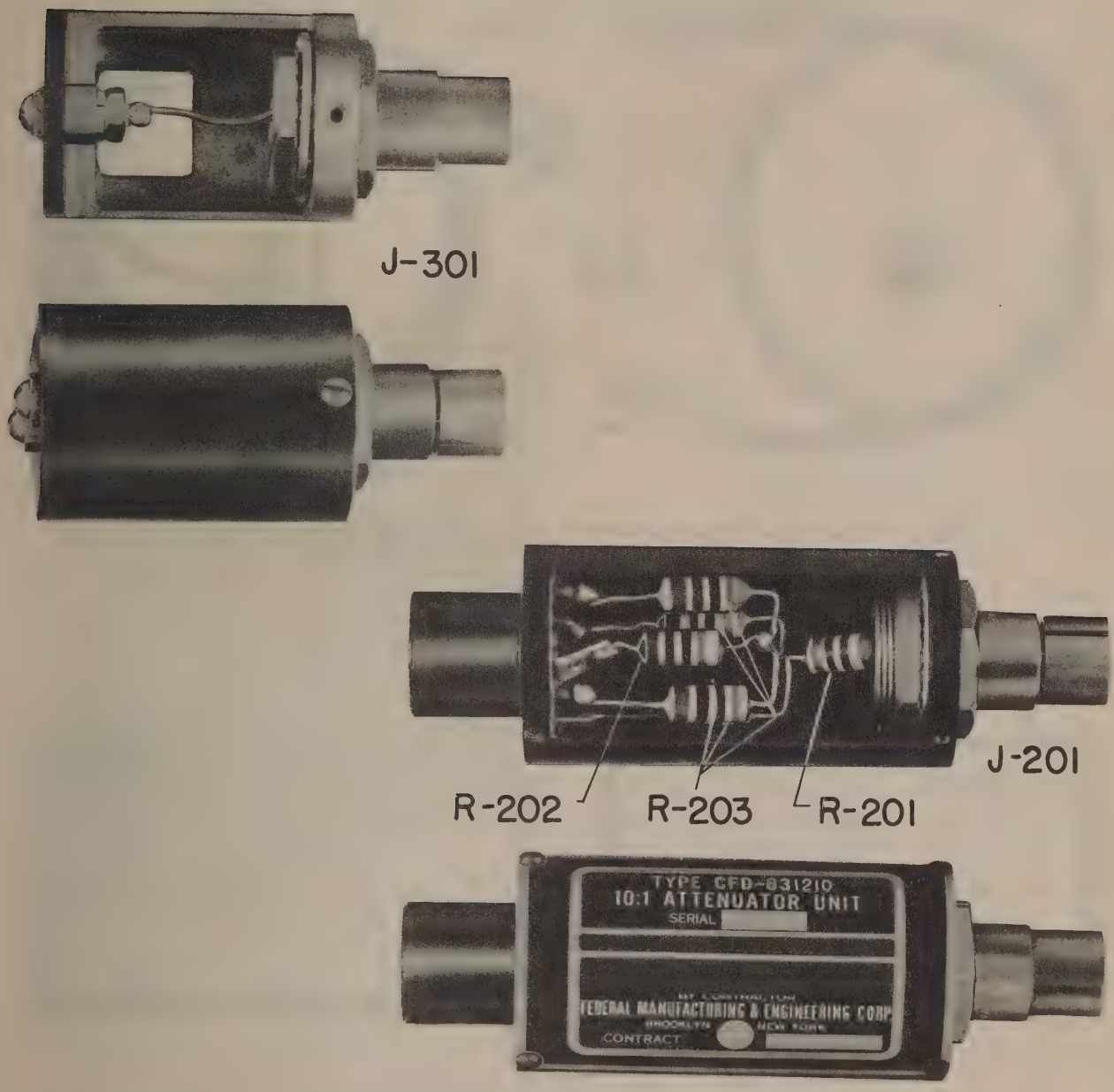


Figure 7-9—Exterior and Interior Views of the Terminal Unit (J-301) and 10:1 Attenuator Unit (J-201)

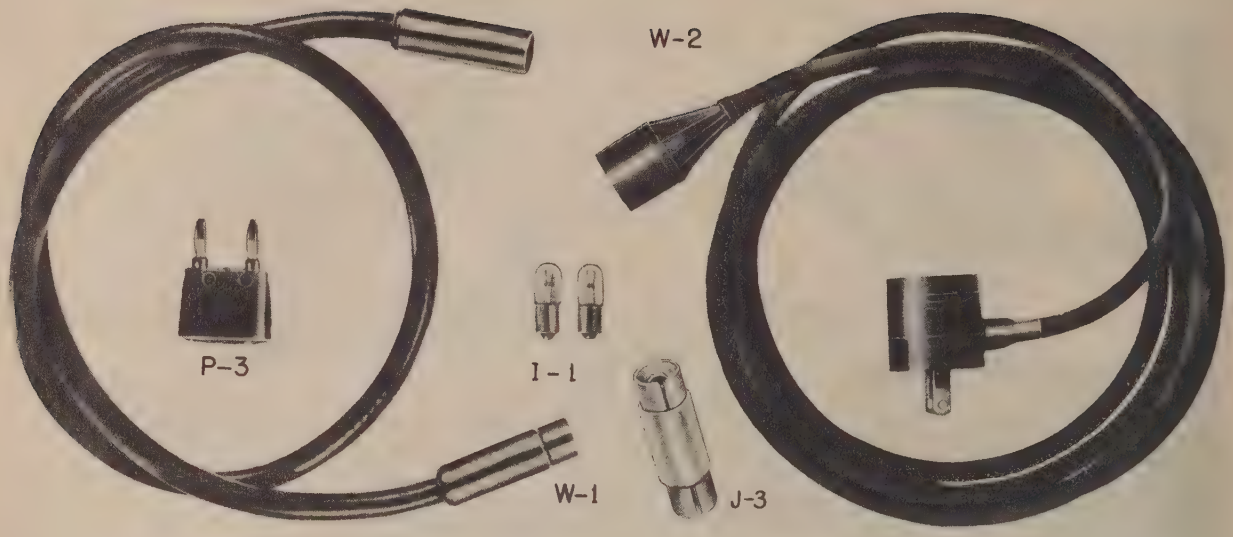
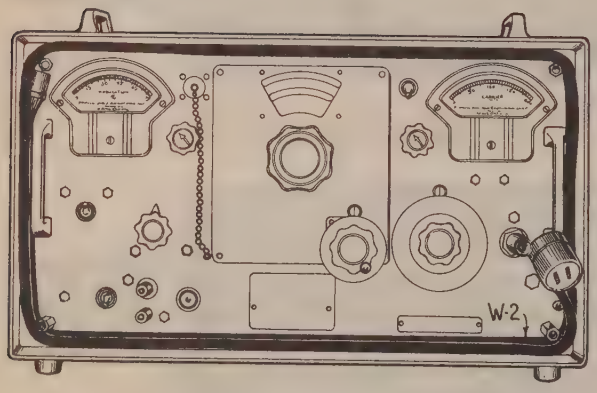
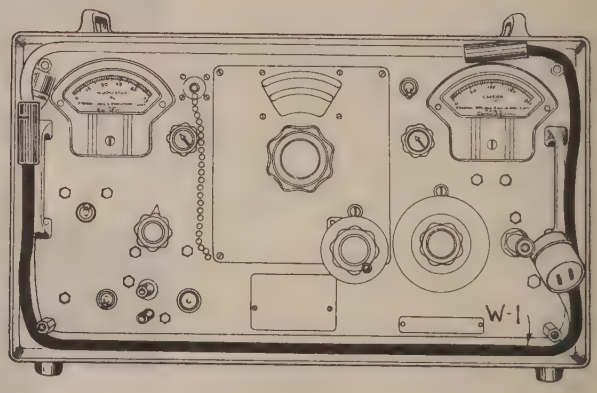


Figure 7-10—Coaxial Output Cable (W-1), A.C. Line Cord (W-2), Double Plug (P-3), Coaxial Connector Plug (J-3) and Spare Pilot Lights (I-1)



FIRST STEP The A.C. Line Cord (W-2) is packed around studs as shown. Start at upper left-hand stud and wind in counter-clockwise direction.



SECOND STEP The Coaxial Output Cable (W-1) is next packed as indicated over the A.C. Line Cord (W-2). Again wind in a counter-clockwise direction.

Figure 7-11—Method of Stowing A.C. Line Cord (W-2) and Coaxial Output Cable (W-1) on the Panel of the Signal Generator

QUICK REFERENCE DATA—OPERATING CONTROLS AND INDICATING PARTS

(For use with Figure 7-12 only—For complete Parts List see Table II, Sec. VI)

Symbol Designation	*Function**
E-1	Main Frequency Control Knob (S-3)
E-2	Fine Frequency Control Knob and Dial (C-14)
E-3	MODULATION Control Knob (R-9)
E-4	CARRIER Control Knob (R-10)
E-5	MODULATION (EXT-OFF-INT) Control Knob (S-2))
E-6	Attenuator OUTPUT Control Knob and Dial
E-7	Pilot Lamp Jewel (I-1)
H-1	Binding Post Cap for EXT. MOD. Terminals
H-2	VIDEO Jack Cover (J-2)
H-3	Dust Cover for Main Frequency Dial
H-4	Handles for Removing Panel from Cabinet
I-1	Pilot Lamp
J-1	Coaxial R.F. OUTPUT Jack (R-16)
J-2	VIDEO Input Jack
M-1	Percent Modulation Meter
M-2	Carrier Level Meter
N-1	Type Plate
N-2	Acceptance Plate
N-3	Main Frequency Dial
S-1	POWER Switch
S-2	MODULATION (EXT-OFF-INT) Switch
S-3	Band-change Switch
S-4	VIDEO—NORMAL OPERATION Switch
S-5	NEGATIVE GROUND—POSITIVE GROUND Switch

*Symbol Designations in parenthesis, thus (S-3), indicate part controlled.

OPERATING ACCESSORIES—See Figures 7-9 and 7-10

W-1	Coaxial Output Cable
W-2	A.C. Line Cord
J-201	10:1 Attenuator Unit
J-301	Terminal Unit
J-3	Coaxial Connector Plug
P-3	Double Plug
I-1	Spare Pilot Lamp

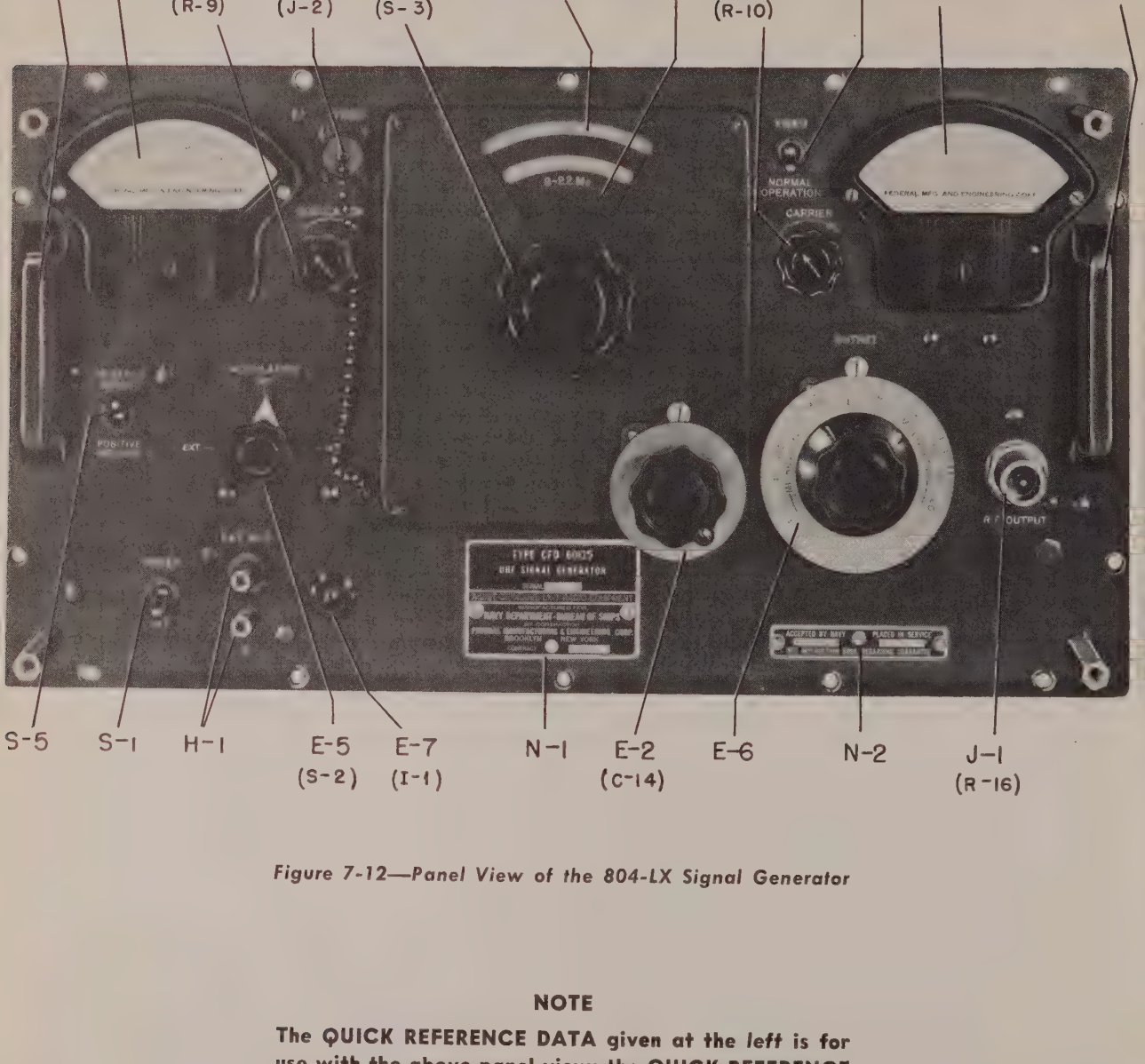


Figure 7-12—Panel View of the 804-LX Signal Generator

NOTE

The QUICK REFERENCE DATA given at the *left* is for use with the above panel view; the QUICK REFERENCE DATA at the *right* for use with the various illustrations throughout the book.

QUICK REFERENCE DATA—ELECTRICAL PARTS

(For Complete Parts List see Table II, Sec. VI)

CAPACITORS

C-1	Power Line Filter Capacitor	0.001 μf
C-2	Power Line Filter Capacitor	0.001 μf
C-3	Power Line Filter Capacitor	0.001 μf
C-4	Power Line Filter Capacitor	0.001 μf
C-5	Power Line Filter Capacitor	10 μf
C-6		10 μf
C-7		5 μf
C-8	Modulator Oscillator Tuning Condenser	0.015 or 0.016 μf
C-9	Power Supply By-pass Capacitor	0.8 μf
C-10	Grid Blocking Condenser for Internal Modulation	0.1 μf
C-11	Audio Input Coupling Condenser	0.01 μf
C-12	Cathode By-pass Condenser for V-4	400 μf
C-13	Grid Blocking Condenser for V-4	50 μμf
C-14	R-F Oscillator Tuning Condenser	12-150 μμf
C-15	Attenuator Fixed Condenser	100 μμf
C-16	Attenuator Input Voltage Divider	30 μμf
C-17	Attenuator Input Voltage Divider	2 μμf
C-18	Attenuator Variable Capacitor	0-15 and 15-0 μμf
C-19	Modulation Meter Filter Capacitor	0.00034 μf
C-20	Modulation Meter Filter Capacitor	0.00034 μf
C-21	Carrier Meter Filter Capacitor	0.00034 μf
C-22	Carrier Meter Filter Capacitor	0.00034 μf
C-24	Audio Input Filter Condenser	0.0004 μf
C-25	Audio Input Filter Condenser	0.0004 μf
C-26	Modulation Meter Filter Capacitor	0.001 μf
C-27	Modulation Meter Filter Capacitor	0.001 μf
C-28	Carrier Meter Filter Capacitor	0.001 μf
C-29	Carrier Meter Filter Capacitor	0.001 μf
C-101	Video Input Filter Condenser	200 μμf
C-102	Video Input Filter Condenser	100 μμf

PILOT LAMP

I-1	Pilot lamp. 6.3 volts; Mazda No. 44 clear; bayonet base	

INDUCTORS

L-1	Power Line Filter Choke	See Table II, Sect. VI
L-2	Power Line Filter Choke	See Table II, Sect. VI
L-3	Modulation Choke	See Table II, Sect. VI
L-4	Modulation Tuning Inductor	See Table II, Sect. VI
L-5	Oscillator Plate R-F Choke	See Table II, Sect. VI
L-10	Carrier Oscillator Tuning Inductor	240-230 Mc.
L-11	Carrier Oscillator Tuning Inductor	120-340 Mc.
L-12	Carrier Oscillator Tuning Inductor	50-120 Mc.
L-13	Carrier Oscillator Tuning Inductor	22-50 Mc.
L-14	Carrier Oscillator Tuning Inductor	8-22 Mc.
L-	Carrier Oscillator Tuning Indicator	Plug-in Blank Coil Form
L-101	Video Input Filter Choke	10 μh
L-102	Video Input Filter Choke	10 μh

μf microfarads.
μμf micromicrofarads.

METERS

M-1	Percent Modulation Meter	7.5 volts A.C. Rectifier Type
M-2	Carrier Level Meter	200 Microamperes D.C.

RESISTORS

R-1	Power Supply Filter Resistor	1250 ohms
R-2	Power Supply Filter Resistor	1250 ohms
R-3	Cathode By-pass Resistor for V-3	500 ohms
R-4	Grid Resistor for V-3 External Modulation	500,000 ohms
R-5	Grid Resistor for V-3 Internal Modulation	30,000 ohms
R-6	Cathode By-pass Resistor for V-4	200 ohms
R-7	Grid Resistor for V-4	25,000 ohms
R-8	Attenuator Output Series Resistor	30 ohms
R-9	Modulation Control Potentiometer	20,000 ohms
R-10	Carrier Control Potentiometer	50,000 ohms
R-11	Audio Input Filter Resistor	500 ohms
R-12	Modulation Meter Filter Resistor	500 ohms
R-13	Modulation Meter Filter Resistor	500 ohms
R-14	Carrier Meter Filter Resistor	500 ohms
R-15	Carrier Meter Filter Resistor	500 ohms
R-16	Output Resistor	75 ohms
R-17	Carrier Meter Filter Resistor	500 ohms
R-18	Carrier Meter Filter Resistor	500 ohms
R-19	Audio Input Filter Resistor	500 ohms
R-20	V-3 Grid Pansitic Suppressor Resistor	100 ohms

SWITCHES

S-1	POWER Switch	D.P.S.T.
S-2	MODULATION (EXT-OFF-INT) Switch	4 P.D.T.
S-3	Band-change Switch	Coil Rack; Special
S-4	VIDEO—NORMAL OPERATION Switch	S.P.D.T.
S-5	NEGATIVE GROUND—POSITIVE GROUND Switch	S.P.D.T.

TRANSFORMER

T-1	Power Supply Transformer	See Table II, Sect. VI

TUBES

V-1	Power Supply Rectifier Tube	Type 6X5G or 6X5-GT/G
V-2	Voltage Regulator Tube	Type VR-150-30
V-3	Modulator Tube	Type 6G6G
V-4	Oscillator Tube	Type 955

μh microhenries.

← *Figure 7-12—Panel View of the 804-LX Signal Generator*

QUICK REFERENCE DATA—ELECTRICAL PARTS

(For Complete Parts List see Table II, Sec. VI)

CAPACITORS

C-1	Power Line Filter Capacitor	0.001 μf
C-2	Power Line Filter Capacitor	0.001 μf
C-3	Power Line Filter Capacitor	0.001 μf
C-4	Power Line Filter Capacitor	0.001 μf
C-5	Power Line Filter Capacitor	10 μf
C-6		10 μf
C-7		5 μf
C-8	Modulator Oscillator Tuning Condenser	0.015 or 0.016 μf
C-9	Power Supply By-pass Capacitor	0.8 μf
C-10	Grid Blocking Condenser for Internal Modulation	0.1 μf
C-11	Audio Input Coupling Condenser	0.01 μf
C-12	Cathode By-pass Condenser for V-4	400 μf
C-13	Grid Blocking Condenser for V-4	50 $\mu\mu f$
C-14	R-F Oscillator Tuning Condenser	12-150 $\mu\mu f$
C-15	Attenuator Fixed Condenser	100 $\mu\mu f$
C-16	Attenuator Input Voltage Divider	30 $\mu\mu f$
C-17	Attenuator Input Voltage Divider	2 $\mu\mu f$
C-18	Attenuator Variable Capacitor	0-15 and 15-0 $\mu\mu f$
C-19	Modulation Meter Filter Capacitor	0.00034 μf
C-20	Modulation Meter Filter Capacitor	0.00034 μf
C-21	Carrier Meter Filter Capacitor	0.00034 μf
C-22	Carrier Meter Filter Capacitor	0.00034 μf
C-24	Audio Input Filter Condenser	0.0004 μf
C-25	Audio Input Filter Condenser	0.0004 μf
C-26	Modulation Meter Filter Capacitor	0.001 μf
C-27	Modulation Meter Filter Capacitor	0.001 μf
C-28	Carrier Meter Filter Capacitor	0.001 μf
C-29	Carrier Meter Filter Capacitor	0.001 μf
C-101	Video Input Filter Condenser	200 $\mu\mu f$
C-102	Video Input Filter Condenser	100 $\mu\mu f$

PILOT LAMP

I-1	Pilot lamp. 6.3 volts; Mazda No. 44 clear; bayonet base	

INDUCTORS

L-1	Power Line Filter Choke	See Table II, Sect. VI
L-2	Power Line Filter Choke	See Table II, Sect. VI
L-3	Modulation Choke	See Table II, Sect. VI
L-4	Modulation Tuning Inductor	See Table II, Sect. VI
L-5	Oscillator Plate R-F Choke	See Table II, Sect. VI
L-10	Carrier Oscillator Tuning Inductor	240-230 Mc.
L-11	Carrier Oscillator Tuning Inductor	120-340 Mc.
L-12	Carrier Oscillator Tuning Inductor	50-120 Mc.
L-13	Carrier Oscillator Tuning Inductor	22-50 Mc.
L-14	Carrier Oscillator Tuning Inductor	8-22 Mc.
L-	Carrier Oscillator Tuning Indicator	Plug-in Blank Coil Form
L-101	Video Input Filter Choke	10 μh
L-102	Video Input Filter Choke	10 μh

μf microfarads.
$\mu\mu f$ micromicrofarads.

METERS

M-1	Percent Modulation Meter	7.5 volts A.C. Rectifier Type
M-2	Carrier Level Meter	200 Microamperes D.C.

RESISTORS

R-1	Power Supply Filter Resistor	1250 ohms
R-2	Power Supply Filter Resistor	1250 ohms
R-3	Cathode By-pass Resistor for V-3	500 ohms
R-4	Grid Resistor for V-3 External Modulation	500,000 ohms
R-5	Grid Resistor for V-3 Internal Modulation	30,000 ohms
R-6	Cathode By-pass Resistor for V-4	200 ohms
R-7	Grid Resistor for V-4	25,000 ohms
R-8	Attenuator Output Series Resistor	30 ohms
R-9	Modulation Control Potentiometer	20,000 ohms
R-10	Carrier Control Potentiometer	50,000 ohms
R-11	Audio Input Filter Resistor	500 ohms
R-12	Modulation Meter Filter Resistor	500 ohms
R-13	Modulation Meter Filter Resistor	500 ohms
R-14	Carrier Meter Filter Resistor	500 ohms
R-15	Carrier Meter Filter Resistor	500 ohms
R-16	Output Resistor	75 ohms
R-17	Carrier Meter Filter Resistor	500 ohms
R-18	Carrier Meter Filter Resistor	500 ohms
R-19	Audio Input Filter Resistor	500 ohms
R-20	V-3 Grid Pansitic Suppressor Resistor	100 ohms

SWITCHES

S-1	POWER Switch	D.P.S.T.
S-2	MODULATION (EXT-OFF-INT) Switch	4 P.D.T.
S-3	Band-change Switch	Coil Rack; Special
S-4	VIDEO—NORMAL OPERATION Switch	S.P.D.T.
S-5	NEGATIVE GROUND—POSITIVE GROUND Switch	S.P.D.T.

TRANSFORMER

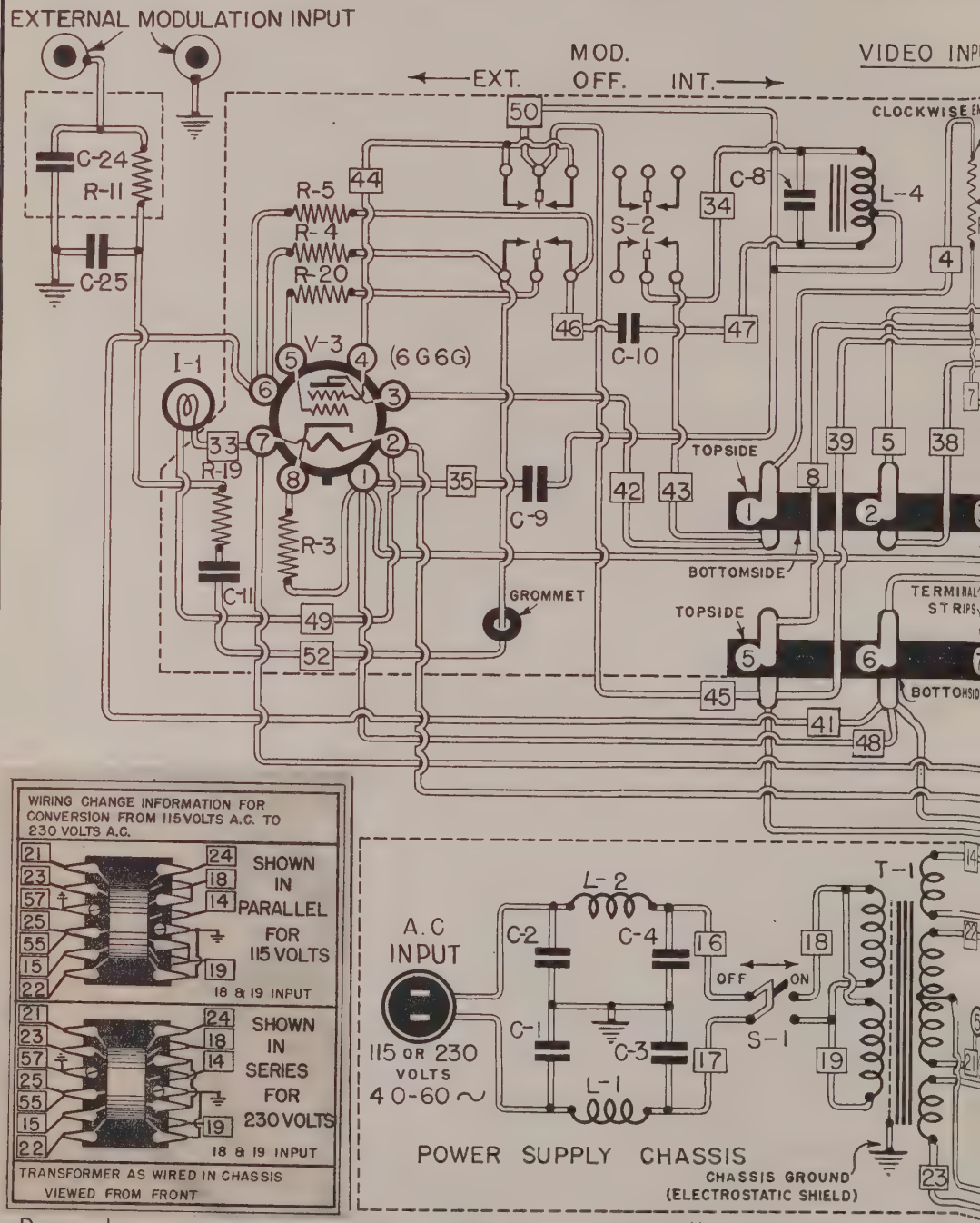
T-1	Power Supply Transformer	See Table II, Sect. VI

TUBES

V-1	Power Supply Rectifier Tube	Type 6X5G or 6X5-GT/G
V-2	Voltage Regulator Tube	Type VR-150-30
V-3	Modulator Tube	Type 6G6G
V-4	Oscillator Tube	Type 955

μh microhenries.

804-LX U. H. F. SIG



DOTTED LINES INDICATE COMPONENTS CONTAINED IN AND WIRED ON A COMPLETE SUB-ASSEMBLY. INTERCONNECTIONS BETWEEN UNITS ARE ALSO SHOWN.

WHERE, FIGURE SIMILAR TO THIS INDICATES A WIRE WHICH CONTA ON BOTH ENDS.

GNAL GENERATOR

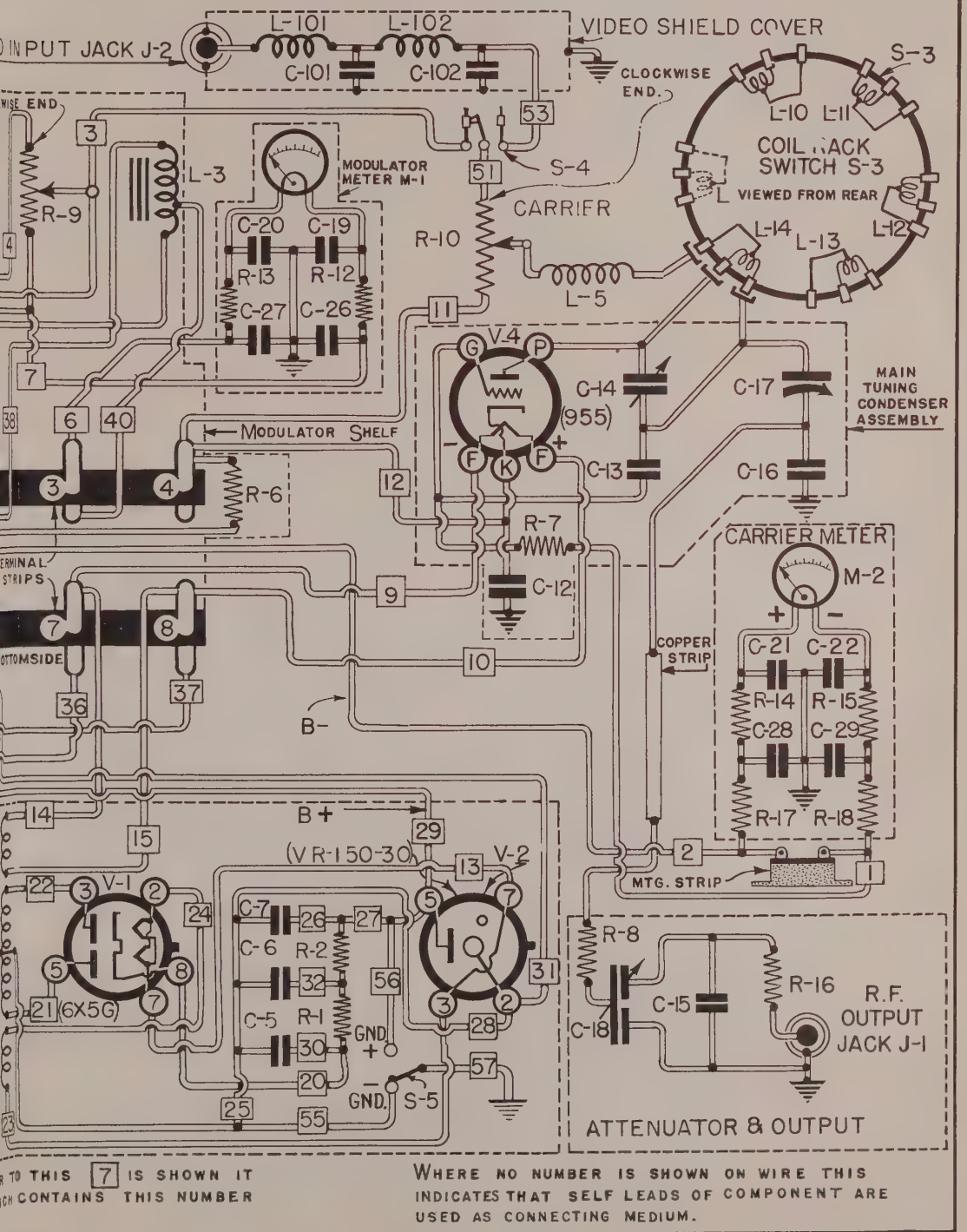


Figure 7-13—Practical Wiring Diagram of the 804-LX U.H.F. Signal Generator

QUICK REFERENCE DATA—ELECTRICAL PARTS

(For Complete Parts List see Table II, Sec. VI)

CAPACITORS

C-1	Power Line Filter Capacitor	0.001 μf
C-2	Power Line Filter Capacitor	0.001 μf
C-3	Power Line Filter Capacitor	0.001 μf
C-4	Power Line Filter Capacitor	0.001 μf
C-5	Power Line Filter Capacitor	10 μf
C-6		10 μf
C-7		5 μf
C-8	Modulator Oscillator Tuning Condenser	0.015 or 0.016 μf
C-9	Power Supply By-pass Capacitor	0.8 μf
C-10	Grid Blocking Condenser for Internal Modulation	0.1 μf
C-11	Audio Input Coupling Condenser	0.01 μf
C-12	Cathode By-pass Condenser for V-4	400 μf
C-13	Grid Blocking Condenser for V-4	50 $\mu\mu f$
C-14	R-F Oscillator Tuning Condenser	12-150 $\mu\mu f$
C-15	Attenuator Fixed Condenser	100 $\mu\mu f$
C-16	Attenuator Input Voltage Divider	30 $\mu\mu f$
C-17	Attenuator Input Voltage Divider	2 $\mu\mu f$
C-18	Attenuator Variable Capacitor	0-15 and 15-0 $\mu\mu f$
C-19	Modulation Meter Filter Capacitor	0.00034 μf
C-20	Modulation Meter Filter Capacitor	0.00034 μf
C-21	Carrier Meter Filter Capacitor	0.00034 μf
C-22	Carrier Meter Filter Capacitor	0.00034 μf
C-24	Audio Input Filter Condenser	0.0004 μf
C-25	Audio Input Filter Condenser	0.0004 μf
C-26	Modulation Meter Filter Capacitor	0.001 μf
C-27	Modulation Meter Filter Capacitor	0.001 μf
C-28	Carrier Meter Filter Capacitor	0.001 μf
C-29	Carrier Meter Filter Capacitor	0.001 μf
C-101	Video Input Filter Condenser	200 $\mu\mu f$
C-102	Video Input Filter Condenser	100 $\mu\mu f$

PILOT LAMP

I-1	Pilot lamp. 6.3 volts; Mazda No. 44 clear; bayonet base	

INDUCTORS

L-1	Power Line Filter Choke	See Table II, Sect. VI
L-2	Power Line Filter Choke	See Table II, Sect. VI
L-3	Modulation Choke	See Table II, Sect. VI
L-4	Modulation Tuning Inductor	See Table II, Sect. VI
L-5	Oscillator Plate R-F Choke	See Table II, Sect. VI
L-10	Carrier Oscillator Tuning Inductor	240-230 Mc.
L-11	Carrier Oscillator Tuning Inductor	120-340 Mc.
L-12	Carrier Oscillator Tuning Inductor	50-120 Mc.
L-13	Carrier Oscillator Tuning Inductor	22-50 Mc.
L-14	Carrier Oscillator Tuning Inductor	8-22 Mc.
L-	Carrier Oscillator Tuning Indicator	Plug-in Blank Coil Form
L-101	Video Input Filter Choke	10 μh
L-102	Video Input Filter Choke	10 μh

μf microfarads.
$\mu\mu f$ micromicrofarads.

METERS

M-1	Percent Modulation Meter	7.5 volts A.C. Rectifier Type
M-2	Carrier Level Meter	200 Microamperes D.C.

RESISTORS

R-1	Power Supply Filter Resistor	1250 ohms
R-2	Power Supply Filter Resistor	1250 ohms
R-3	Cathode By-pass Resistor for V-3	500 ohms
R-4	Grid Resistor for V-3 External Modulation	500,000 ohms
R-5	Grid Resistor for V-3 Internal Modulation	30,000 ohms
R-6	Cathode By-pass Resistor for V-4	200 ohms
R-7	Grid Resistor for V-4	25,000 ohms
R-8	Attenuator Output Series Resistor	30 ohms
R-9	Modulation Control Potentiometer	20,000 ohms
R-10	Carrier Control Potentiometer	50,000 ohms
R-11	Audio Input Filter Resistor	500 ohms
R-12	Modulation Meter Filter Resistor	500 ohms
R-13	Modulation Meter Filter Resistor	500 ohms
R-14	Carrier Meter Filter Resistor	500 ohms
R-15	Carrier Meter Filter Resistor	500 ohms
R-16	Output Resistor	75 ohms
R-17	Carrier Meter Filter Resistor	500 ohms
R-18	Carrier Meter Filter Resistor	500 ohms
R-19	Audio Input Filter Resistor	500 ohms
R-20	V-3 Grid Pansitic Suppressor Resistor	100 ohms

SWITCHES

S-1	POWER Switch	D.P.S.T.
S-2	MODULATION (EXT-OFF-INT) Switch	4 P.D.T.
S-3	Band-change Switch	Coil Rack; Special
S-4	VIDEO—NORMAL OPERATION Switch	S.P.D.T.
S-5	NEGATIVE GROUND—POSITIVE GROUND Switch	S.P.D.T.

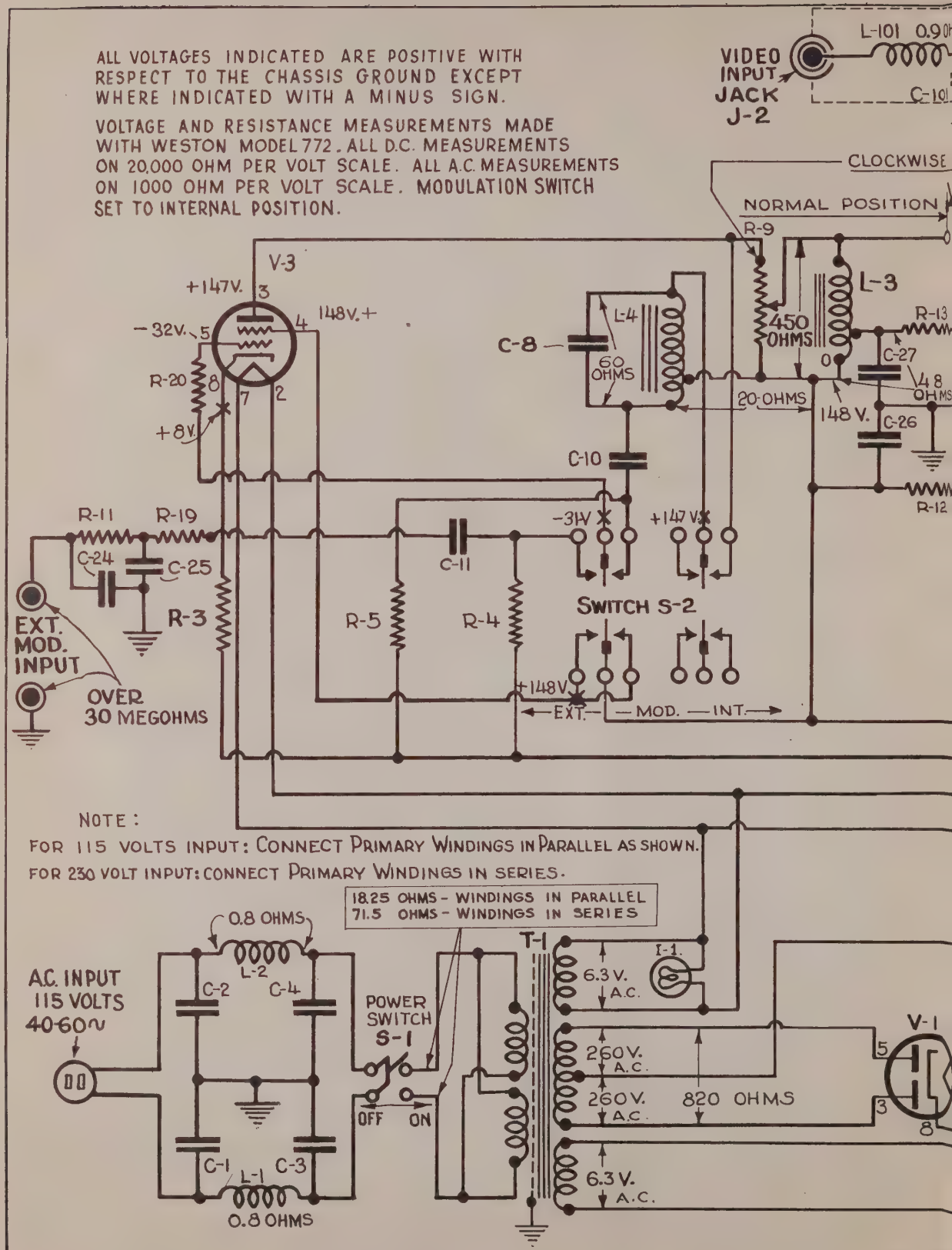
TRANSFORMER

T-1	Power Supply Transformer	See Table II, Sect. VI

TUBES

V-1	Power Supply Rectifier Tube	Type 6X5G or 6X5-GT/G
V-2	Voltage Regulator Tube	Type VR-150-30
V-3	Modulator Tube	Type 6G6G
V-4	Oscillator Tube	Type 955

μh microhenries.


ALL VOLTAGES INDICATED ARE POSITIVE WITH RESPECT TO THE CHASSIS GROUND EXCEPT WHERE INDICATED WITH A MINUS SIGN.
VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH WESTON MODEL 772. ALL D.C. MEASUREMENTS ON 20,000 OHM PER VOLT SCALE. ALL A.C. MEASUREMENTS ON 1000 OHM PER VOLT SCALE. MODULATION SWITCH SET TO INTERNAL POSITION.
VIDEO INPUT JACK J-2
L-101
C-101
CLOCKWISE
NORMAL POSITION
R-9
V-3
+147V.
-32V.
148V.+
+8V.
R-20
L-4
C-8
60 OHMS
450 OHMS
L-3
R-13
C-27
48 OHMS
20 OHMS
148 V.
C-26
R-12
C-10
R-11
R-19
C-24
C-25
R-3
C-11
-31V
+147 V.
SWITCH S-2
R-5
R-4
+148V.
EXT.
MOD.
INT.
EXT. MOD. INPUT
OVER 30 MEGOHMS
NOTE:
FOR 115 VOLTS INPUT: CONNECT PRIMARY WINDINGS IN PARALLEL AS SHOWN.
FOR 230 VOLT INPUT: CONNECT PRIMARY WINDINGS IN SERIES.
18.25 OHMS - WINDINGS IN PARALLEL
71.5 OHMS - WINDINGS IN SERIES
0.8 OHMS
L-2
C-2
C-4
A.C. INPUT 115 VOLTS 40-60~
POWER SWITCH S-1
OFF
ON
T-1
I-1.
6.3 V. A.C.
260 V. A.C.
260 V. A.C.
820 OHMS
6.3 V. A.C.
V-1
C-1
L-1
C-3
0.8 OHMS

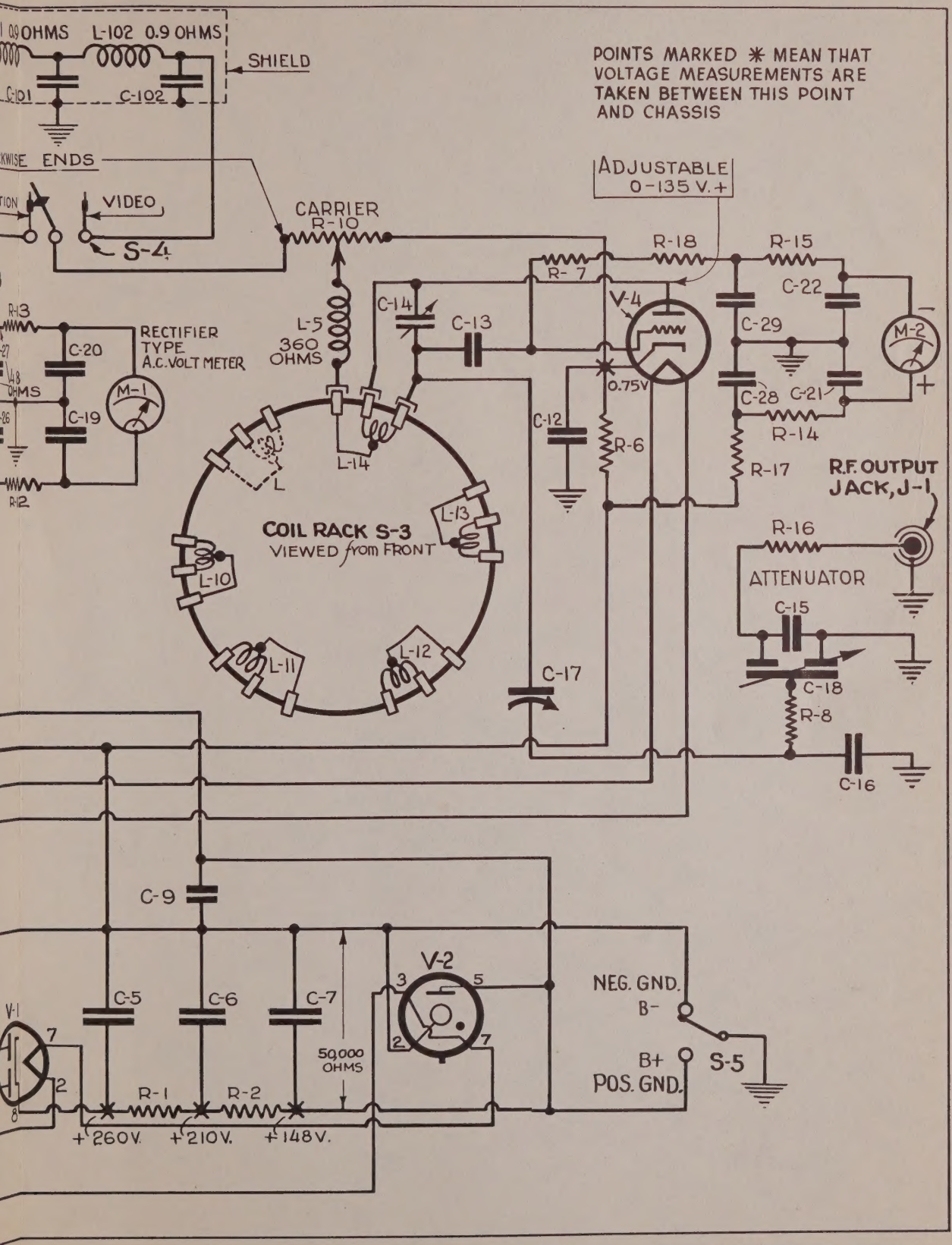
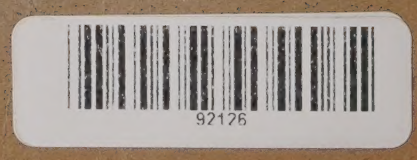


Figure 7-14—Regular Schematic Diagram of the 804-LX U.H.F. Signal Generator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